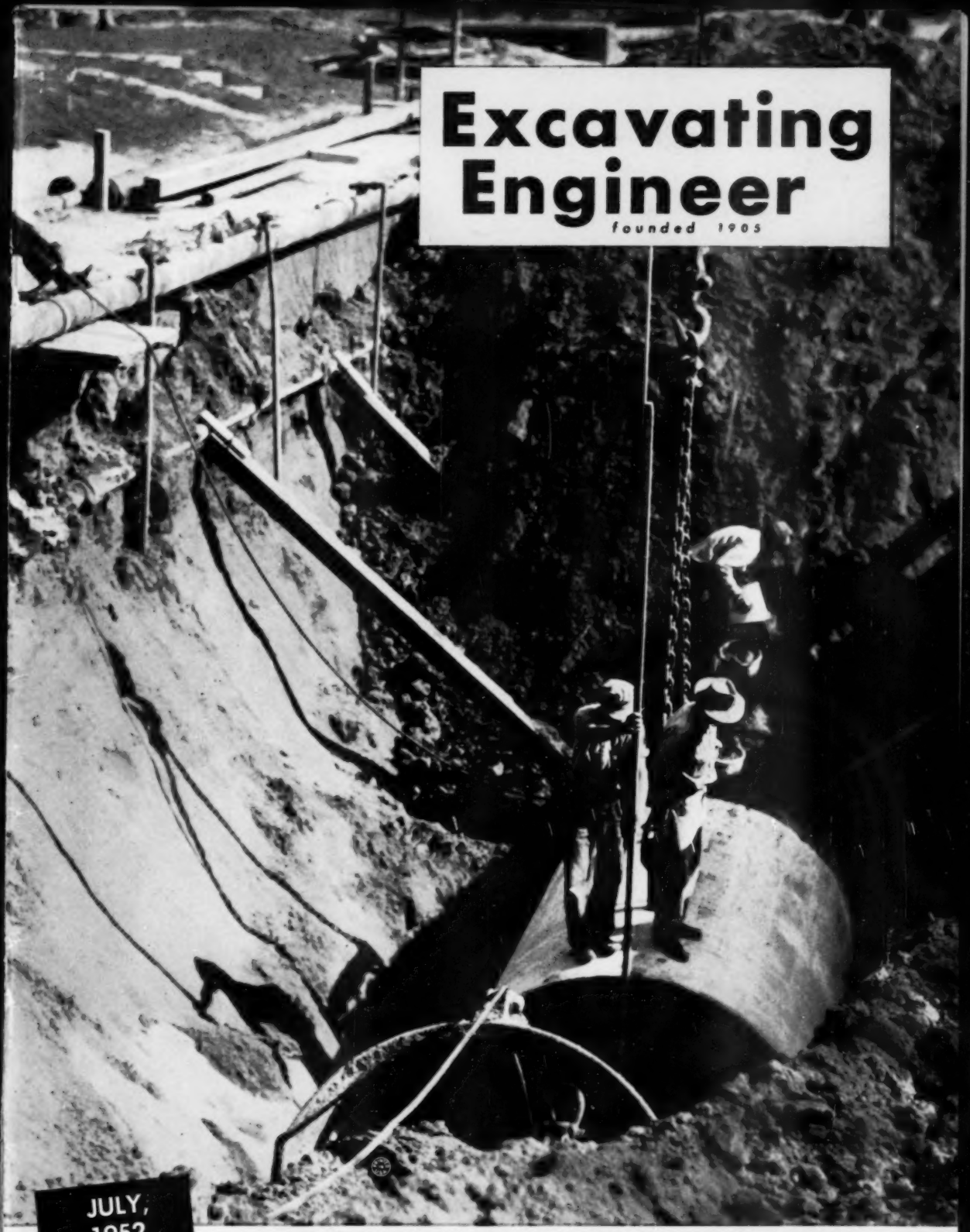
Excavating Engineer

founded 1905



JULY, 1952

ABATING RIVER POLLUTION is the job of this crew building the first treatment plant and 200,000 feet of sewer for Evansville, Ind. The medium-sized city on the Ohio's banks is taking a big step toward reducing contamination — a growing problem in the U.S. In this picture, workmen check grade on a length of pipe which must be put in one piece at a time to beat caving silt. Article begins on page. 12.

How Bucyrus-Erie Drills Give You

Extra

DRILLING FOOTAGE ...EVERY SHIFT

FAST-working Bucyrus-Erie Blast Hole Drills deliver P-O-W-E-R at the point of impact that pushes holes down fast. Here's what makes that power add up.

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27-T	6"	to 6¾" holes
29-T	6"	to 9" holes
42-T	9"	to 12" holes

Diesel or electric power is available for all machines, gasoline for all except 42-T.

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Excavating Engineer

founded 1905

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Air Bases in North Africa 20
One of the five joint venturers known as Atlas Constructors recently issued a 16-page pamphlet outlining "the other side" of the North African air base controversy. *Excavating Engineer* is pleased to reprint the statement herewith.

Mexican Firms Build Veracruz-Acayucan Coastal Road — by Edward F. London 24
Two Mexican contractors are pioneering an all-weather highway south from the important seaport of Veracruz to Acayucan. It is expected that the black-top road—built under exceptional difficulties —will open to traffic, though only partly surfaced, during 1952.

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EXPLOSIVES PARADOX

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Air conditioning enables Hercules to control atmospheric conditions while the dynamite is being packaged behind the barricade. In other words, it keeps your powder dry.

This is another example of Hercules pioneering that gives you better made explosives with better blasting efficiency.

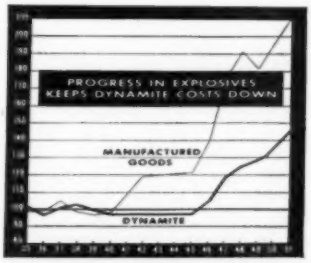

Chart shows relative stability of dynamite prices since 1935, as compared with prices of other manufactured goods. 1935-39 values=100.

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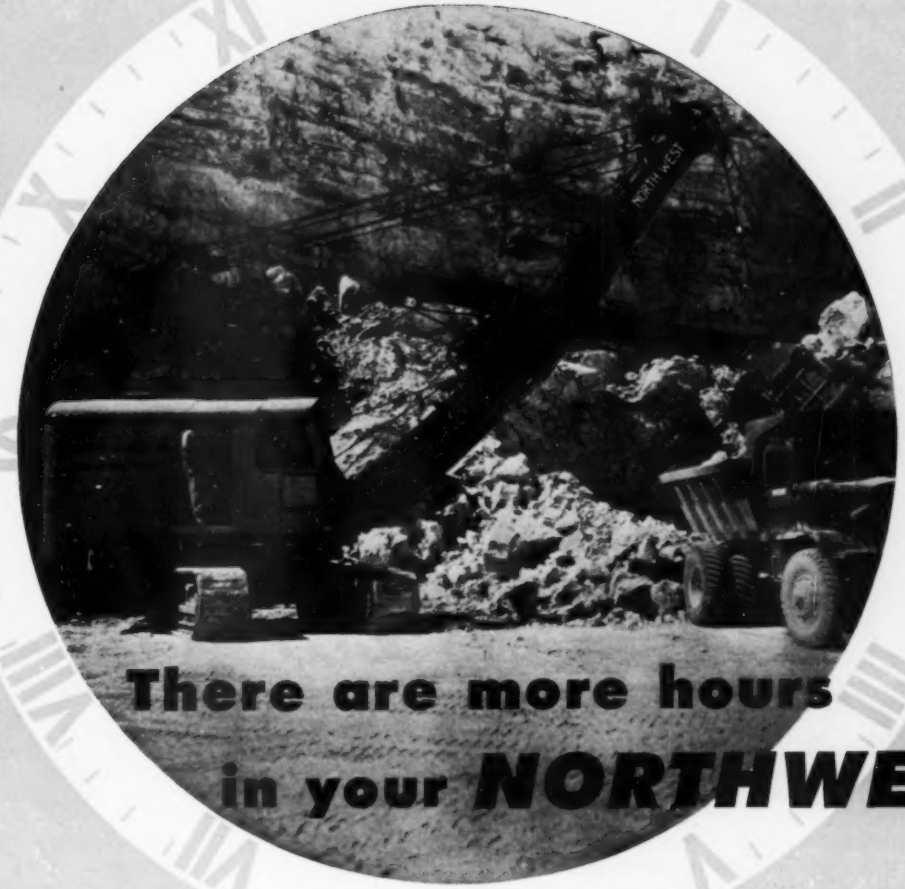

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Diesel powered and built with big strength margins all round, Muir-Hill Dumpers are in world wide use bringing lowest operating costs to bear in countless jobs where large scale plant cannot be used.

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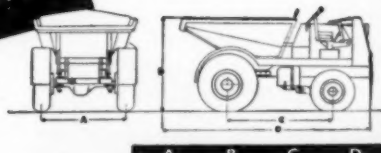

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The Universally Popular

ARE IDEALLY ADAPTED TO ALL KINDS AND MAKES OF CRANES

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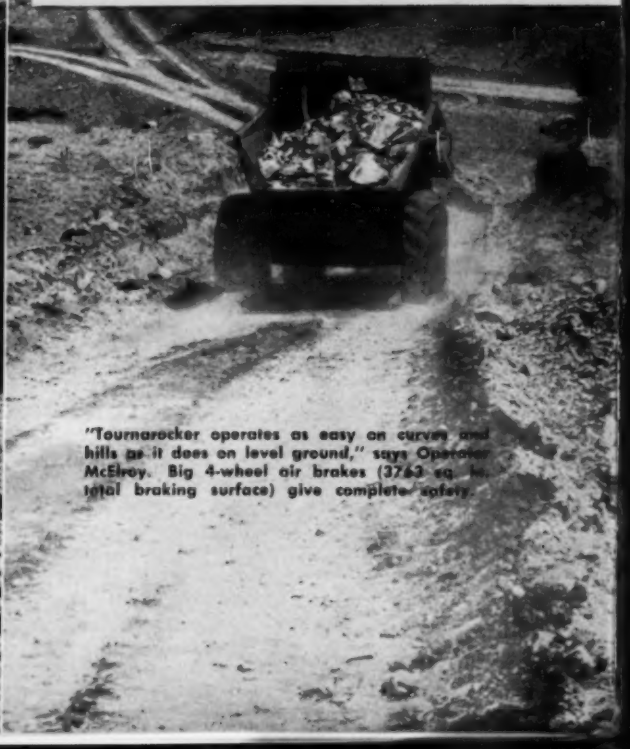
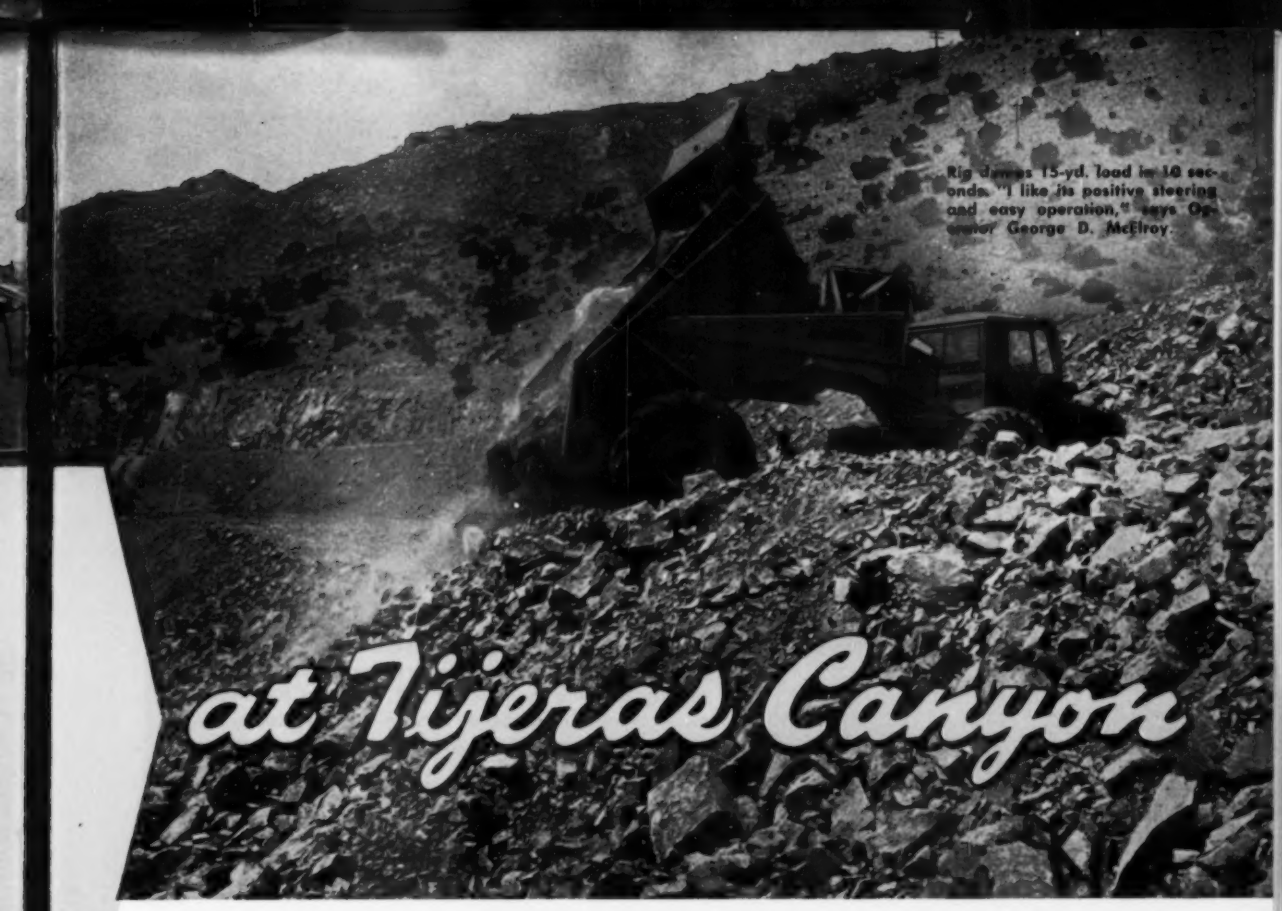


"Tournarocker operates as easy on curves and hills as it does on level ground," says Operator McElroy. Big 4-wheel air brakes (3763 sq. in. total braking surface) give complete safety.


Rig dumps 15-yd. load in 10 seconds. "I like its positive steering and easy operation," says Operator George D. McElroy.
at Tijeras Canyon

Skousen-Hise Tournarocker hauls up 10 to 15% grades

When Skousen-Hise Contracting Co., Albuquerque, New Mexico, started building a new 4-lane route for U.S. 66 through the Sandia Mountains, 6 miles east of Albuquerque, the job called for a fast, maneuverable rear-dump hauler for work in restricted quarters. After careful consideration of available machines, the company decided on a 16-ton 35 m.p.h. C Tournarocker—a rig which has a turning radius of only 13'9". Roading the electric-control "Rocker" through traffic at Tijeras Canyon, Skousen-Hise got the following profitable production on the 1,000,000-yd. project.

2400' cycle every 6 minutes

With sideboards to increase capacity, C Roadster was loaded with approximately 15 pay yards of blasted, partially decomposed granite in 9 passes of a 1¾-yd. shovel. In spite of occasional delays which boosted average load time to 3 minutes, rig completed a 2400' cycle every 6 minutes . . . made 9 trips, delivered 135 pay yards per hour. Haul to fill included 240' of 15% downgrade, 100' of 10% adverse grade. Haul speed averaged 11 m.p.h.

"Can't beat Tournarocker" says Superintendent Isbell

With 2500 hours on the machine, owners are very satisfied with Tournarocker's performance. 100 days ahead of a 400-day schedule because of good weather and high production, Job Superintendent Andy Isbell says, "For maneuvering around in rocks and tight places, you can't beat the Tournarocker."

Check other job reports

Whenever you have dirt or rock to move, it will pay you to check the high output and low costs other contractors are getting with LeTourneau rear-dumps, bottom-dumps, and Carryall Scrapers. See your LeTourneau Distributor for job-proved facts and figures on work like yours.

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It's the rugged, rock-proved Type BD hydraulically dumped body featuring EASTON's patented automatic down folding side gate.

This fast, versatile hauler switches easily from job to job, handling rock, ore, earth or mixed loads over any road or grade that your chassis can negotiate. It's a newcomer, introduced a little more than a year ago, rapidly winning interest for fast, low-cost hauling in many types of off-highway service. For complete information ask your local off-highway truck salesman, or write to:

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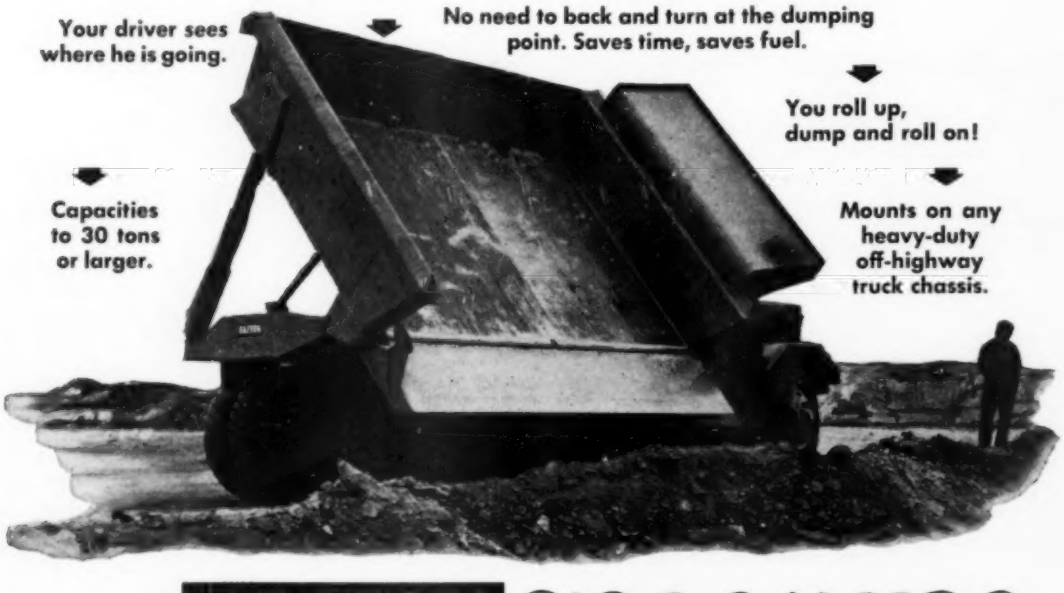
Now you can have these big side-dump advantages in a versatile side-dump unit


Your driver sees where he is going.
No need to back and turn at the dumping point. Saves time, saves fuel.
You roll up, dump and roll on!
Capacities to 30 tons or larger.
Mounts on any heavy-duty off-highway truck chassis.

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GM DIESEL CASE HISTORY No. 519-18

USER: Wissota Sand and Gravel Company, Eau Claire, Wisc.

Firm produces 500,000 tons a year.

INSTALLATION: GM 4-71 Diesel replaced gasoline engine in 1¼-yd. dragline four years ago. Firm also repowered two shovels and a portable crusher with GM Diesels and powers a washing plant pump with a 4-71.

PERFORMANCE: With GM Diesel Power, the dragline loads one-third more per day while costing about half as much to operate. Operator says GM starts easier and permits faster swings with quicker recovery under load.

Repowered crusher produces 25% more and costs 25% less to run.

This Diesel Loads 33% More Gravel

at one-half the fuel cost

GM
GENERAL MOTORS
DIESEL POWER

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River Town Battles Pollution

Evansville, Ind., spends $5 million on its first sewage treatment plant and 200,000 feet of feeder line. Local contractor, Ryan Construction Corp., masters sand and water hazards to keep job ahead of schedule.

• Sewer trench for 72-in. pipe hits grade at 18.52 feet. Top width of trench is often greater than depth due to caving silt. A Bucyrus-Erie 54-B dragline with oversize 4-yd. Hendrix bucket digs trench, lays pipe and backfills. Buda Diesel powers the dragline.

THIS article deals with the important river pollution problem of our day and shows how one city is taking a giant step toward making it less of a problem. All over our country, inland waterways have become flowing waste disposal plants. Cities pump their storm and sanitary effluent into them. Industries use them as depository for the fluids and gases left over after manufacture.

In earlier times, the river was a broad-shouldered Hercules who could absorb this punishment. The population, and hence the amount of refuse, was small in ratio to the volume of swift-flowing water. Not so today—the load has surpassed the capacity.

The nation's waterways are still the scenic landmarks they were in our grandfather's day. But they have relinquished many of the qualities which made them dear to his heart. The fish are not as taste-pleasing nor as numerous as before. Frequently the water emits foul odors which dim the pleasure of fisherman, boating devotee and ordinary householder. Satisfactory treatment of water drawn for municipal use becomes more difficult. Swimming is unthinkable in many river-side towns.

The Ohio River, where it horseshoes past Evansville, Ind., fits this unhappy description. Now, Evansville is only a medium-sized industrial community of 135,000 population. It contributes a mouse's share toward contaminating the wide Ohio. Big brothers upstream must bear much of the blame.

Though Evansville plays a minor role as villain, the work it is now backing will go a long way toward making it one of the heroes of the piece. Like many towns along the Ohio, Evansville has always pumped its sewage directly from the mains into the river. At low or normal river level the effluent is discharged underwater. At high level, the gates are closed to prevent back flow. Then the sewage is unloaded over the levees onto the stream surface.

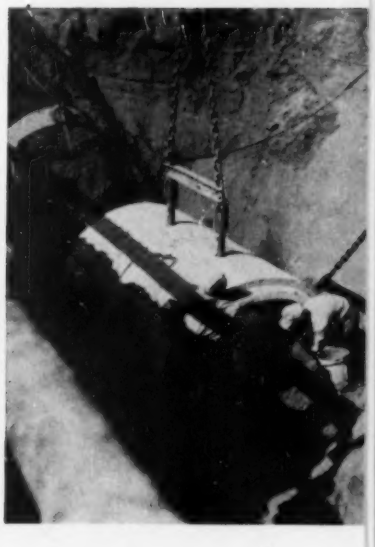
Citizens Take Action

Local citizens showed excellent judgment in 1950 when the matter was put before them. In a referendum vote, they authorized a bond issue to finance

• Top left: Excavator backfills each length of pipe as soon as it is installed. Top center: The best that can be hoped for is to get a long enough section of trench to place the next pipe. Here caving has eaten beyond curb line, is near sidewalk. Top right: Bucket is detached and wire rope sling used to bring pipe to horizontal position. Pipe weighs more than 9 tons per length.

• Above left: Special Ryan-built sling is attached through lateral holes in obvert of sewer pipe. Above right: Sling holds pipe slightly high on male side for easier placement against last-laid length of pipe.

• Right: Russell Craig, foreman on the 54-B dragline spread. Second right: Mortar men wear rubber gloves to hand-coat joint. A ring of oakum helps seal joint. Note temporarily idle bucket dug into bank.



• Above: Vitrified clay 6-in. tile is laid from lateral holes in sewer pipe obvert to tie-in to individual houses. Below: Fairbanks-Morse pump with International engine is installed below street grade. Wellpoints can be set deeper without exceeding maximum pull of pump.

construction of the town's first sewage treatment plant and initial 200,000 feet of combination storm and sanitary line to feed it. This was not a small decision to make. It was the largest money appropriation for municipal improvement in the city's history.

While the first footage will cover only the east side of town, it will serve approximately 50,000 residents. Future plans call for construction of other treatment plants and for tying-in several of the present pumping plants. The latter, instead of directing sewage into the river will route it to the new plant.

The city invited contractors to look over the job and file bids in the early part of 1951. A number of reliable firms considered the project carefully but at deadline, there were only five envelopes to be opened. The tricky composition of the Evansville soil and the high underground water table chased out the others. Soil borings indicated nothing but sand and river silt with about the same consistency as sand. The contractor who undertook the work would have to put in some 40

• Above: Some of Ryan Construction Corporation's key personnel: (left to right) Victor Hinton, foreman, Oren Rath, concrete superintendent Phillip A. Ryan, vice president; Bob Arden, engineer; and Paul Adders, equipment superintendent. Below: Bucyrus-Erie 22-B with ¾-yd. Owen bucket digs tie-in sewer connection. Machine also sets pipe, pulls wellpoints.

• Powered by Buda gas engine, this ¾-yd. Bucyrus-Erie 20-B dragshovel digs 9-ft. deep, 10-ft. wide trench for 24-in. pipe. Parallel taut lines in foreground are used to verify grade and pipe level when sited on pole held in trench.

miles of fairly deep sewer through one continuous sand pile. How many cubic yards of cave-in would he have to add to the yardage needed to cut the trenches? It was a question that many of the firms did not care to answer in writing.

Tests showed also that most of the excavation would be carried to an average depth 8 feet below ground water level. It was apparent that wellpointing was called for throughout. Would the points keep the water out? Would they prove too expensive?

The prospect of mixing sand and water—ideal ingredients for an excavating contractor's nightmare — produced five bids. Three of them were too steep for further consideration. Ryan Construction Corp., an Evansville firm with a background of experience in the local soil, was low bidder. They were awarded the job at a price of approximately $5 million.

City officials turned the first spadeful of silt on Apr. 1, 1951, and the project was underway. To handle 85% of the digging and all of the heavy pipe-laying, the Ryan firm selected a combination of draglines, dragshovels, clamshells and cranes. Assigned to the job were the following crawler-mounted machines: three Bucyrus-Erie 54-B's, three Bucyrus-Erie 22-B's, one Bucyrus-Erie 20-B and one Bucyrus-Erie 38-B. In addition, a Bucyrus-Erie 22-B Transit Crane joined the project at an early stage.

Two of the 54-B's were equipped with oversize Hendrix dragline buckets and the third swung a 2-yd. Blaw-Knox clamshell bucket. All three rode on extra-long, extra-wide crawlers to combat soft ground conditions. Two sets of wood mats were supplied for ex-

• Above: Hook welded on dragshovel dipper carries sling and special hook which is inserted in length of pipe. Below: Excavator positions pipe in trench.

tremely mucky going in low, water-saturated areas.

The 22-B's were harnessed with dragline and dragshovel front-ends. Both the 38-B and 20-B machines operated with dragshovel business end. The contractor equipped his truck crane with a ¾-yd. Owen clamshell.

Five trenchers went in the pool of equipment on the job. Three Barber-Greene ditchers dig house connections while an Austin and a brand new Parsons Trenchliner get sewer digging assignments wherever the ground allows. An estimated 15% of the ditch can be put down with these machines provided shoring is set immediately following the digging ladder.

Six front-end loaders complete the dirt-movers which the Ryan Corporation put on the sewer job. Three are crawler mounted and 3 are wheeled. A Hough front-end serves an International TD-9 tractor; a Bucyrus-Erie Dozer-Shovel is mounted on an International T-9 gas crawler; and a Traxcavator works from a D4 Caterpillar. Among the Hough wheeled loaders is a new HMD Payloader with Hercules Diesel engine.

Contractor Ryan's choice of heavy excavating equipment proved to be wise from the beginning. Caving sides upped by two or three times the yardage moved to bring excavations to invert grade.

As the sewer rolled along, the crawler-mounted excavators were put to work in several combinations. They worked in threes, pairs, and in solo—depending on ground conditions, working area (width of street), and depth of cut.

On exceptionally deep cuts—20 feet and more—the 38-B dragshovel moved

• Below: A 1½-yd. HMD Hough Payloader powered by Hercules Diesel backfills while Bucyrus-Erie 20-B digs another stretch of trench.

● Above left: Along Washington Ave., a Bucyrus-Erie 54-B with 2-yd. Blaw Knox clamshell digs trench. Above center: Here, too, open hook permits quick changeover from excavator to crane service. Excavator is worked at exceptionally low boom angle so clamshell closing line need not be detached. Above right: A D4 Caterpillar tractor with Traxcavator loader helps out on backfill.

down the line taking out the first 15 feet. A 22-B dragline then traveled the bottom of the ditch which the first machine made. It took out the final cut to grade. The dragline in the hole relayed dirt to the back hoe which spoiled it along with the dirt taken out in making the initial trench. Well-point headers were set below street grade as the lead cut of 15 feet was made. Both the 38-B and the 22-B swing oversize buckets—as do most of Ryan's machines on the job. The contractor found this feasible because the digging is fairly easy.

With the ditch at required grade, another 22-B trailed the first two machines by 50 to 100 feet. Its task was to position the concrete pipe in the excavation and backfill. Concrete pipe is fabricated with male and female ends. These were mortared together as soon as a section of pipe was placed. Mortaring was done quickly without tools by workmen wearing rubber gloves. A ring of oakum embedded in the mortar joint assures tightness.

In the above procedure and in all the pipelaying to follow, it was necessary to devise a method of changing from crane to excavator in a matter of seconds. As soon as a piece of pipe is mortared in place, the excavation above it must be backfilled. The cut is in constant peril of further caving. It is just possible to keep it open for the few minutes needed to install a pipe section. Shores are no help because the excavation has to be made exceptionally wide. For example, a 25-ft. wide cut is frequently required to get an 18-ft. trench.

Hook on Buckets

To effect the quick changeover, all clamshell and dragline buckets are attached to hoist lines by means of an open hook. As soon as the pipe has been placed by sling on hook, the hook is re-attached to the bucket and the fill begins. Careful, skilled operators keep the buckets from being disengaged while in use. There have been no accidents due to this type of operation in putting down the 26 miles of sewer which were laid up to the time of *Excavating Engineer's* visit.

Two 54-B's were teamed to accomplish the same type of operation. One with outsize 4-yd. Hendrix bucket backed down the line making trench. Another followed setting pipe and backfilling. The second machine was equipped with a clamshell. Here again, the open hook permitted quick excavator-to-crane transition.

Both these multi-machine combinations were used to install much of the large-barrel trunk lines which form the connectors between laterals and treatment plant. However, working areas were becoming more confined when we saw the job. Narrow streets, often flanked with trees, restrict the number of machines which can be moved in. Often there is only room for a single excavator pattern of operation.

Typical of the solo method was the work of the 54-B dragline as it moved down a side street off the main Washington Avenue trunk line. To put down this branch of the trunk line, the excavator handles all operations. It digs the trench, positions the 72 in. by 10 ft. pipe and backfills.

Caving presents a serious problem here. To bring the excavation to the 18.52-ft. bottom grade, the excavator tapers the trench from a 25-ft. width at the top. This spans the street, curb-to-curb. With the boom set at low angle to give long reach needed in backfill, the machine drags out just enough trench to accommodate the next length of pipe. The sand and silt taken out covers the previously laid length of pipe. Thus a measure of support is applied to the exposed banks as soon as possible. Workmen wedge 6 x 6 timbers between the pipe and the ditch sides. These help keep the caving from extending back of the curb line which means restoring more than the street. The timbers are buried under the fill.

Two sets of sighting lines stretched taut along either side of the sidewalk at a 2-ft. height certify bottom grade. These are installed parallel to each other and to the line of excavation. An extra-long surveyor's type pole with an L bottom is set on the grade line when the foremen signals that a suitable length of grade is established. An engineer then visually lines up the two stringers with marks on the pole. Thus he tells accurately whether the grade is too deep or on the shallow side.

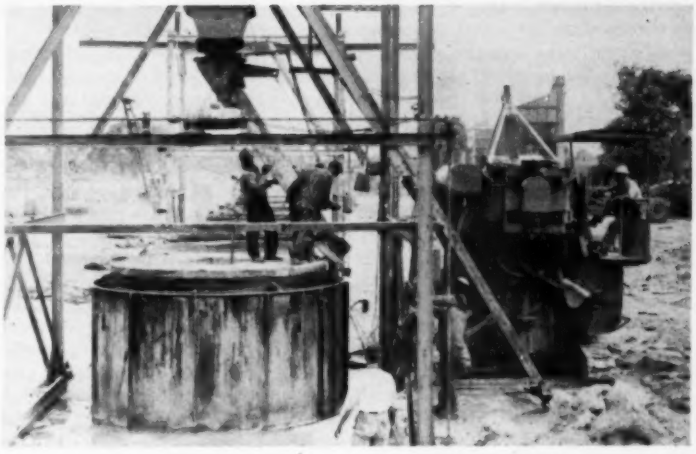
With the grade on mark, the dragline pulls its bucket into the end bank and it is unhooked. Workmen attach a wire rope sling which is circled

around the length of pipe on deck. Since the pipe sits on its end, it is necessary to set it on the ground horizontally. A wire rope sling is wrapped around the barrel and the crane tips it over gently. A special Ryan-invented hitch for placing the 9-ton lengths is then inserted through two 6-in. holes in the pipe side. This rig holds the pipe with obvert on top and just a little high on the male side which connects with the previously installed length. The high-on-one-side carrying position aids in setting pipe.

The operator lowers the section into place. A three-man crew working inside the completed barrel attaches two steel hooks to the female, or far, side of the pipe. The hooks, worked off a chain and ratchet come-along, quickly and smoothly pull the section flat against the last-laid length. At this point, the engineer checks for lateral and horizontal position once more. The mortaring crew lays 6-in. house laterals from the holes which were used to attach the special crane hook. Backfill goes in immediately.

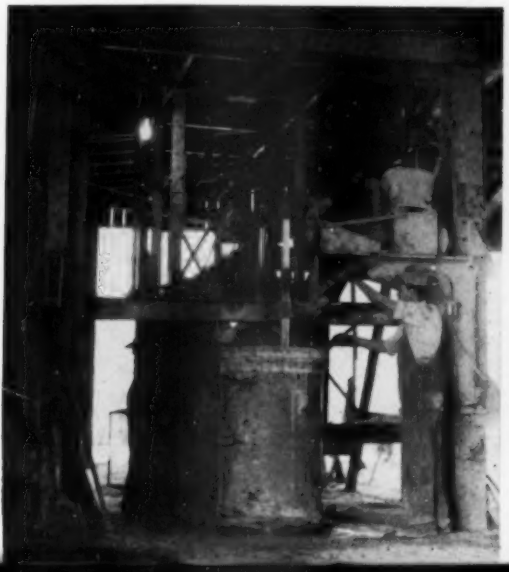
On the main Washington Avenue trunk line, another 54-B crew lays 72-in. pipe in a sequence about the same as above. Here, however, the machine excavates with a clamshell and the boom angle is even lower to clear trees and power lines. Here also, a D4 Caterpillar with Traxcavator front-end takes care of a big share of the backfill. Ground conditions are slightly more favorable and trench width is kept to approximately 18 feet.

A third crew commands a 10-year-old 20-B dragshovel to put down the 24-in. Dexter Avenue lateral sewer. The machine digs 9-ft. deep by 9-ft.



• Top: Reinforcing steel is set in form to make cast pipe. Above: Pouring gantry moves into place and pour begins. Gantry is fed by Foote 34 mixer.

• Below left: Also in yard of Queen City Concrete Pipe Corp., reinforced pipe below 72-in. diameter is spun. No-slump concrete is fed to form and automatically tamped as it spins. Inner form is raised, outer form is hi-lifted to one side and stripped immediately. Spun pipe holds shape without support. In these pictures, the machine was spinning 400 feet of 24-in. pipe in 8-hour shift.



wide trench (exceptional width again needed to combat sandy soil) and places pipe. A hook welded to the dipper eliminates the changeover characteristic of the other spreads. Ryan planners assigned the older 20-B to this job because its narrow ¾-yd. dipper decreases the bottom width, and hence the top width. A 1½-yd. Hough HMD Payloader with Hercules Diesel places all cover for this crew.

Another pipe-laying crew installs laterals with the help of the Austin ditcher and the new Parsons Trenchliner. As soon as a linear foot of the 10-ft. deep trench is cut, workmen set in wooden shores to protect the mortar men. Screw jacks hold the shoring in place. On this operation the International T-9 gas powered crawler with Bucyrus-Erie Dozer-Shovel handles both the backfill and crane operations.

A fifth spread of equipment concentrates on tap-ins. Each householder along the route may contract with Ryan to have a lateral installed leading up to his property. There is nothing compulsory about this. Installation at this stage proves cheaper than when the street is resurfaced. The Barber-Greene ditchers cut trench for house laterals as well as some street lateral footage. The Hough front-end loader on the International crawler does backfill and crane work when necessary.

A number of miscellaneous chores fall under the scope of the transit crane because of its mobility. It sets all the manholes and most of the catch basins. This is fairly steady work in itself since there are about 1,000 of them in the entire project. A 60-in. augur drills the excavations for the catch basins while much of the digging for manholes is accomplished with the ¾-yd. Owen clamshell on the transit crane. Again, this bucket is attached with an open hook for quick changeover. In addition, the truck mounted crane puts in a number of odd-lot tie-ins and pulls wellpoints. Buda gas engines power both ends of the transit crane.

Become Wellpointers

The Ryan organization entered the well-pointing business in a big way when it undertook the Evansville sewer job. The company purchased its own complete system.

Eight inch header lines accommodate down lines on 4-ft. centers. However, 8-ft. centers will pull out the water in most stretches and the Ryan crews were plugging every other tap. Wherever the 8-ft. pattern would not do the trick, extra points are run down from the 4-ft. centers. Down lines are 21-ft. lengths of 2-in. pipe with 3-ft. points, giving a total pull of 24 feet.

Fairbanks Morse pumps are skid mounted and powered by International engines. They feed into a 10-in. discharge line which flows into a manhole of the completed sewer line. A nail hole size leak anywhere in the suction line causes an immediate drop in the suction reading. It must be remedied quickly to keep the pump cool. When any point stops pulling water and begins drawing air, a drop on the suction gauge is immediately noticeable also.

It was found that most excavations for 30-in. pipe and larger would need wellpointing. Points are strung along both sides of the excavation with headers 24-ft. apart. Two hundred lineal feet are kept in the ground at all times. This footage centers on the excavator, and another 100 feet is always in the process of being pulled or set. A 4-in. Augur cuts through the layer of topsoil or silt—usually from 2 to 4 feet—and the points are speedily jetted down the rest of the way.

Procedure is to drive the points 6 feet below grade. This draws water down and away from the excavation. To avoid exceeding the maximum pull of the pumps, it is frequently necessary to dig a hole for pumps and install the header below street level. In deep excavation, the wellpoint system is used anywhere from 2 to 10 feet below ground level.

The Ryan crews discovered early in the operation that a wellpoint line placed on the side of the excavation away from the river is much more effective. It pulls more water than the river-ward line, apparently due to the natural underground flow towards the river's bed.

Water level above sewer grade was running about 8 feet. It was not actually level but, as the foreman put it, "like a snake's back crawling." Thus the switch to 4-ft. centers becomes necessary in spots.

An associate company, Queen City Concrete Pipe Corp. of Cincinnati, manufactures all the concrete pipe used on the job. The contractor was fortunate in being able to lease a 16-acre tract plump in the center of the heavy-pipe part of the project. Pipe hauling distances are thus minimized.

All pipe of 21-in. inside diameter and larger is of reinforced concrete

• Left: Model EC-15 Tournacrane with short jib boom and special belly bands picks up length of cast concrete pipe in yard.

• Right: Rig carries pipe along Evansville street. Second right: Pipe is strung along sewer line where needed.

manufactured on the job site. Pipe below 18-in. is vitrified clay made by the Cannalton Sewer Pipe Co., Cannalton, Ind. Manholes are also cast in the contractor's plant.

Spin and Cast Pipe

Pipe below the 72-in. size is spun while the 72-in. and larger barrels, to 120-in., are cast. In the pipe plant yard, rail-mounted pouring and handling gantrys manipulate the big forms and the pours. A batching unit supplies dry mix which is fed to a Foote 34 mixer. Sand and gravel are bought from local producers: Koch Sand & Gravel Co. and Bedford-Nugent Sand & Gravel Co. Cement is Kosmos Portland. Special forms were built for the cast pipe. Lengths are sometimes greater than customary, but they are made with the contractor's equipment in mind. The weight of the cast barrels varies from 9 to 14 tons.

A Model EC-15 Tournacrane equipped with short jib boom and special belly-band strings the cast pipe along the line of excavation wherever it is needed. The rig backs into position and the belly-band that is suspended from the hook is lowered over the pipe. The operator goes to the rear of the pipe and tightens the belly-band with a ratchet screw. Skin friction holds the belly-band to the surface of the cast pipe. The crane then raises the pipe from the ground and hauls it to the desired location. At this place, the operator lowers the pipe to the ground, leaving the pipe to stand on end.

Pipe below 72 inches is spun. In a fast-moving set up, the crew was spinning 400 feet of 24 in. pipe per 8-hour day when *Excavating Engineer's* representative watched the operation. A Ross hi-lift unhooks the filled form from the spinning machine, sets it aside and inserts an empty form. The machine spins while a no-slump concrete, exceptionally lean on water, is chuted into the form. Automatic vibrators assure a solid pack. With the form filled, the spinner stops and the edge of the pipe is finished by hand. Forms are unclamped and removed almost immediately and the formed concrete holds shape. A rough surface limestone from upriver quarries substitutes for gravel in the spun mix. Its poor sliding qualities help hold the wet concrete in shape.

A reinforcing wire mesh is spun into the pipe and the concrete cures for 7 days. One hundred 4-ft. lengths were turned out in a typical 8-hour shift.

Reinforcing bars instead of mesh are embedded in all cast pipe. Pipe which fails critical examination is set aside and sold to farmers for culvert use.

Concrete pipe is manufactured in the following quantities for the Evansville job: 1,500 feet of 120-in.; 5,000 feet of 108-in.; 2,700 feet of 96-in.; 3,500 feet of 90-in.; 1,500 feet of 84-in.; 4,100 feet of 72-in.; 2,700 feet of 66-in.; 4,500 feet of 60-in.; 10,000 feet of 54-in.; 1,250 feet of 48-in.; 1,600 of 42-in.; 5,900 feet of 36-in.; 1,100 feet of 33-in.; 4,600 feet of 30-in.; 4,300 feet of 27-in.; 9,500 feet of 24-in.; and 18,000 feet of 21-in.

Nine sections comprise the contract which Ryan Construction signed with the city of Evansville. They cover the seven lateral areas, the trunk area and the treatment plant. Individual sections may be completed and accepted by the city before the entire job winds up. Two lateral sections were accepted by the end of April, 1952, and two more were on the verge. Except for the arrival of electric switch gear, the treatment plant was completed. It consists of an intake plant, agitator basin, aeriation pools, and connecting tunnels. Twenty thousand yards of concrete went into its construction. Excavation and crane work were done with a 54-B equipped with dragline bucket. Since the plant is located just back of the levee, de-watering was one of the major problems.

The contractor built a concrete weir to by-pass the treatment plant and lead directly into the Ohio river. This was done so sewer could be put into use as it was laid. It is, of course, only a temporary arrangement.

By the end of April, Ryan had 130,000 of the total 200,000 feet of pipe in the ground. Crews were putting in 1,000 feet per day and they were well ahead of the schedule which aims for December 1st completion. All pipe above 84-in. diameter had been laid. The 72-in. and below remained although many of the smaller sizes were already buried.

The contractor also has the job of re-establishing the surface of the streets after excavation. Where trunk lines are put in, the entire street will be repaved. On lateral lines, the street will be suitably patched. Street resurfacing has been let to the Fiegel Co., an Evansville concern.

Consoer, Townsend and Associates, the well-known Chicago engineering firm, designed both the sewer system and the treatment plant for the City of Evansville.

Big jobs are not new to the Ryan Construction Corporation. In their scrapbook of successful projects are the Charles Mill Dam in Ohio and Dewey Dam in Kentucky. Most of the levees in the Evansville area are Ryan products. They are well-known for their industrial, hotel and office building construction. At present, they are fulfilling contracts for road and bridge work, water works, power plants and treatment plants.

The Ryan firm was founded in 1928 by the late Roy Ryan and his brother, Mike Ryan, now president. Other firm members are Phillip A. Ryan, vice president and Roy Ryan, Jr., secretary.

Air Bases in North Africa

One of the five joint venturers known as Atlas Constructors recently issued a 16-page pamphlet outlining "the other side" of the North African air base controversy. *Excavating Engineer* is pleased to reprint the statement herewith.

THIS pamphlet is published by Morrison-Knudsen Company, Inc., in order to give what we consider needed information to stockholders of our company, to friends and associates, and to others having a valid interest in M-K and its operations. Commencing in January, 1952, and continuing intermittently into the month of May, newspapers and radio have carried a good many reports of public congressional investigations of the construction of air bases being built in North Africa by a group of American contractors known as Atlas Constructors. Atlas Constructors is the joint-venture name adopted by our company and four other construction firms shortly after all five had been summoned to Washington, Jan. 2, 1951, as a group chosen by the U. S. Army Corps of Engineers. We were handed an assignment to build the bases under a super-high speed program for the U. S. Air Force. M-K was elected sponsor of the joint venture.

The Senate Preparedness Subcommittee of the Committee on Armed Services, of which Senator Lyndon Johnson of Texas is chairman, and the corresponding committee of the House of Representatives, of which Congressman Porter Hardy, Jr., is chairman, conducted these public investigations.

The January hearings purportedly started with the object of inquiring into "employment practices and costs in connection with overseas construction," during which an Atlas personnel officer from the main operating office in New York gave very brief testimony as to employment procedure. It appeared then that the investigation had grown out of the complaints of certain disgruntled employees who had returned from North Africa — a not-unusual experience in establishing foreign jobs as M-K has done in many countries. By March, however, the committee hearings had broadened into general investigations, attempting to explore and criticize the entire conduct of the African air-base operations from their start, more than a year before, under the frantic pressure of what U. S. military authorities called a "crash program."

War Threat Forgotten

Bear in mind that the committees' hearings were taking place more than a year after the start, and after the completion on Jan. 15, 1952, of the desperately urgent "crash program." In December, 1950, the United Nations faced possible defeat in Korea, and possible intervention there by Russia. Gen. Eisenhower had not yet started for Europe to organize the NATO defenses. The then-top-secret proposal to build air bases in North Africa, under a treaty with the French Protectorate Government, was one of the largest and most urgent military defense programs ever conceived.

The air force was conducting negotiations with the French government to locate the sites. The Corps of Engineers as the contracting agency, issued directives for all work to be done by Atlas Constructors. Speed was of the essence and cost was secondary, as emphasized in a telegram sent by the commanding colonel to each of the member companies of Atlas Constructors on April 23, 1951. It concluded with the sentence:

"All the world is depending upon you to accomplish the impossible."

Atlas Constructors did just that. In its first assignment under the crash program it completed runways and minimum facilities in 83 days for two very large air bases, from which bombers and fighter planes were operated in maneuvers on the French Bastille Day, July 14, 1951.

The public committee investigations mentioned seemed to make no allowance for what H. V. Kaltenborn, in a broadcast from Casablanca the 3rd of March, termed the "desperate hurry" at the time those bases were built. Mr. Kaltenborn had gone on to say, in part:

"Congress is now asking whether there was a waste of taxpayers' money in the building of these bases. The answer is, 'yes.' One year ago when we finally worked out an agreement with the French to let us build and run these bases, the air force was in a desperate hurry to get them. China had entered the Korean war. It looked as though Russia might enter it. The army engineers and American contractors—the air force representatives were told to have usable runways and some kind of service operation ready by July. This high-pressure operation wasted a lot of money in a lot of ways. If war had come last summer, the extra money for double time and overtime, for hasty, inadequate planning, and for occasional slipshod work would have been well invested. Since war didn't come, a conscientious Congressman can now say it was wasted. But I have seen letters from Gen. Vandenberg and Gen. LeMay praising the army engineers who supervised the work for a great contribution to American security."

In August of 1951, air force Maj. Gen. Archie Old had stated to two Atlas Constructors officials, in the presence of the army's district engineer, "I could fight a pretty good war off these bases right now."

On Feb. 26, 1952, an Atlas attorney asked the Hardy Committee for permission to testify in reply to false and misleading testimony being heard by the committee. On the 14th of March a request was again made, in a long letter denying many adverse statements. On the 31st of March, another request was made in a detailed letter to Senator Lyndon Johnson. Finally, on the 7th of May, the contractors appeared, by invitation of Senator Johnson, before the Senate Subcommittee on Preparedness.

Two Atlas Constructors officials testified from 10.30 AM to 11:30 PM, with time out for lunch and dinner. They were J. B. Bonny, chairman of the operating committee of Atlas Constructors, and vice-president and general manager of Morrison-Knudsen Co., Inc., and Lyman D. Wilbur, resident partner who is in over-all charge of operations in French Morocco and is a vice president and director of M-K. They were accompanied during the hearing by Atlas' legal counselor, Paul V. McNutt, distinguished attorney of New York and Washington, former governor of Indiana and later of the Philippines.

Before Atlas was invited to face the committee its offices in Casablanca and New York had supplied written evidence in a three-inch-thick stack of bound and indexed documents, answering in detail all of the allegations that had been made before the committee which involved or reflected upon the performance of the contractor. This was a duplicate copy of a report made on Apr. 7, 1952, to the undersecretary of the army at his request. The answers contained in that report were supported by affidavits and copies or photostats of documents where necessary, refuting previous adverse testimony.

Bonny and Wilbur Testify

Messrs. Bonny and Wilbur were sworn jointly as witnesses as a committee courtesy extended so that either could answer, according to his knowledge, any question asked by the committee.

The interrogation was started on a rather belligerent note by the chairman, Senator Johnson, who had before him a copy of the April issue of M-K's magazine, *The EmKayan*, opened to a two-page editorial in which the editor had severely criticized both congressional committees for their long-continued and widely-publicized investigations in which a preponderance of witnesses had impugned and wrongfully reflected on the performance of the contractors before the contractors were given a hearing to refute the allegations.

A prepared statement then was read by Bonny, based primarily upon the documentary evidence in the thick report that the committee had been previously furnished as a copy of the report to the undersecretary of the army. Bonny's prepared statement, taking about 45 minutes, referred the committee to that report and its answers to previous testimony, in which he said:

"These answers, supported by affidavits and copies or photostats of documents where necessary, contain such complete contradiction to some of the testimony given before this committee that not only the credibility but the veracity of certain previous witnesses is challenged. Unfortunately, because many of your hearings have been public—and because all witnesses are under oath—some sections of the press and certain pundits have had a heyday with charges of fraud, mismanagement, waste and graft—at our expense."

Following Bonny's prepared statement, which gave a clear outline of

● ". . . a heyday with charges of fraud, mismanagement, waste and graft"—J. B. Bonny.

the chronology of the contract and operations, Wilbur read a prepared statement detailing the enormous achievements of Atlas Constructors in terms of millions of cubic yards of excavation and fill and square yards of paving; hundreds of buildings covering hundreds of thousands of square feet; and many miles of roads and utility lines. None of these ever had been detailed, even in minor part, in daily press and radio reports of testimony before the congressional committees. Some of them will be itemized below.

Outline of History

Brief excerpts from Bonny's report of the chronological sequence of activities are as follows:

"On Jan. 2, 1951, at 2:00 PM, representatives of the member companies of what was to become Atlas Constructors were called into the office of the Chief of Engineers (Washington) and advised they were to be given a contract for the construction of air bases in North Africa. The work was described as secret in nature, of utmost necessity to national defense, and construction was to be accomplished in the shortest possible time. Six months was the maximum time allowable to produce minimum operational facilities. By July 1, 1951, the five bases, consisting of one new base and four reconstructed bases, were to have such minimum facilities. . . .

"Atlas (not yet named at that time) was also introduced to the Architect-Engineer, the firm of Porter-Urquhart, who had received the letter contract on Dec. 22, 1950, just twelve days earlier.

"A discussion of plans, specifications, locations and quantities covered the following points:

1. There were no plans.
2. There were no specifications.
3. Four bases (later determined to be Meknes, Rabat-Sale, Khouribga, and Marrakech) were listed as existing French air bases, which were to be extended and enlarged.
4. Nouasseur was an entirely new depot base to be constructed.
5. Equipment was to be procured immediately for an estimated 5.3 million cubic yards of excavation, 1,405,000 cubic yards of crusher-run base-course material, and 560,000 tons of asphaltic concrete.

"It was first decided by the district engineer that the base of operations in the United States would be Norfolk, Va. . . . the contractor must purchase equipment from whatever source available and not wait on established government procurement channels, and . . . the contractor would be issued the highest priority possible. . . .

Quick Changes and Confusion

"Headquarters were established in Norfolk, Va., on Jan. 5, 1951. Office space was procured, equipment and supplies were purchased for delivery in Norfolk, and advance personnel, drawn from the member-companies' staffs on less than 24-hour notice, were sent to Norfolk. On Jan. 9, 1951, Atlas was advised by the district engineer that all operations would be moved back to New York . . ." (which was done on the 12th of January). (Note —At this time no representative of the

district engineer, the architect-engineer, nor the contractors had ever seen the site of the work.) A reconnaissance trip was planned but was prevented by objections of the French government until the 22nd of January, three weeks later. Security regulations were such that, although Atlas was directed to start recruitment of men, employees could be told only that they were hired for work on airfields in North Africa. The proposed bases were listed only as "A, B, C, D, and E."

"On Feb. 13, 1951, Atlas shipped the first boatload of equipment and supplies from New York to Casablanca. The second shipload left on the 23rd of February and by the 22nd of April —when the first airfield location was released for construction—nine boatloads (65,532 tons) were in French Morocco." (Meanwhile, the French government had refused clearances for American personnel to enter the country while bargaining with the U. S. Air Force and only 130 were on hand to unload the boats, tally the property, move the material inland, establish offices, yards, prepare equipment for operation, and perform the multitude of tasks necessary to start any construction project. These circumstances illustrated the confusion, uncertainty, and extraneous conditions which existed on the Moroccan project from the beginning.)

Time Was Supreme

"Atlas could have told the respective government agencies that no work of any kind would be done until circumstances permitted an orderly approach to construction, but that attitude does not build air bases in 80 days—at a time when those 80 days were believed to be the difference between war and peace, or the difference between defense and no defense, if war came. . . . Much has been said about the fact that only two bases were readied by July 14, 1951, instead of five as originally contemplated. The fact is that until Dec. 7, 1951, only two bases were released for construction—this is almost a year after the contract was signed. In addition, the two bases originally released have as much base rock tonnage as all five of those originally planned, twice as much excavation as the original five, and one and one half times as much asphalt paving! . . .

"Funds for the work have never been allocated sufficiently in advance to provide for long-range procurement or orderly planning . . . (due to) failure on the part of the appropriate agency to allocate them—not because of lack of appropriation (by Congress). . . . In July 1951, October 1951, February 1952, and in April 1952, Atlas has had to stop procurement, stop recruiting, and reduce construction efforts because of a shortage of sufficient funds to operate the job . . . Atlas has literally done its work on a day-to-day basis of planning and a hand-to-mouth allocation of funds."

● ". . . the work is being accomplished well within the estimates"—L. D. Wilbur.

Bonny explained the often-misunderstood terms of the Atlas cost-plus-a-fixed-fee contract. The fee is a flat sum based on the original estimate. The fee can be increased or decreased only if the scope of the work changes, in which event the fee can be altered by negotiation. "In fact," Bonny pointed out, "if the cost increases while the scope decreases, the fee will be reduced."

Summarizing the Facts

In a long summary of difficult conditions faced and fought by Atlas, Bonny drove home the obstacles under which the contractors, nevertheless, have done more work than expected and below the costs originally estimated, as follows:

"Orderly, economical planning and operation, which is the normal approach to a construction job, is not possible under conditions, such as those surrounding the initial phases of the Moroccan work, where plans and specifications are non-existent; when equipment must be procured wherever obtainable to meet unknown conditions; where quantities of work are not known; where wage rates are established by others months after work is started; where transportation of personnel and shipment of all materials, equipment and supplies are controlled by a separate agency of the government; where ships arrive in a foreign country and insufficient personnel is there to unload, tally, guard and protect the shipments; where work is done in a country using two foreign languages; where housing is extremely scarce, but no place is made available to build camps; where a central office cannot be constructed for a year, causing use of ten separate locations to obtain office space; where a separate foreign governmental agency must approve all action; where communications are very poor; where funds are turned on and off like a faucet; where recruitment and procurement have been started and stopped many times; where camps are built only to be torn down, moved to a new location, torn down and moved again, back to the original location, where construction work is started only to be stopped, the location abandoned; where personnel is recruited, processed and shipped to the point of embarkation and then returned to their homes, discharged, because sufficient funds were not allocated in time."

Lyman D. Wilbur, who flew from Casablanca to Washington for the committee hearing, made the following report of overall production achievements on the Moroccan air bases from the start of work, Apr. 22, 1951, through Mar. 31, 1952:

"Statements that have been made would indicate that far more money has been expended on this project than is the fact, and that much less construction has been accomplished than we have actually done. As the cost figures below will prove, the items of work completed to date and in progress show a tremendous accomplishment to Mar. 31, 1952, less than one year since the inception of the work. The percentage of completion, compared to the original $258,269,800, on which construction has been authorized, indicates that if the scope of the work remains as originally contemplated by the air forces, with allowance for the same percentage of increase in costs that has occurred within the U. S. during the period, the work is being accomplished well within the estimates.

"The field cost to Mar. 31, 1952, amounts to $68,964,000. Costs of

plant, materials and indirect charges, including those not amortized, amount to $91,800,000. This makes the total expenditures $160,764,000, including engineering and inspection. Thirty-five per cent of the total amount of work originally planned has been completed. This includes work at bases not yet selected. Charging 35% of the costs of plant, materials, and indirect charges into the work makes the cost of completed work to Mar. 31, 1952, $101,200,000.

"Included in the expenditures to date are the costs of construction camps, $30 million in construction equipment, plant for complete projects at three bases, and large inventories of materials which are available at the site for future work. Mobilization expense is behind us.

List Work Completed

"For this cost a tremendous amount of work has been accomplished. At Nouasseur, covering an area of over 7,800 acres, the main runway, the parallel taxiway and large areas of parking apron are completed. Additional areas of the proposed parking apron have been partially completed including that portion damaged by the heavy test roller. Housing for 4,500 troops with appurtenant operations buildings and utilities has been completed. Large areas have been paved for open storage, motor pool and other similar uses. Twenty-one warehouse buildings have been constructed with four others under way. Petroleum, oil and lubrication systems with very large storage tanks both above and below ground are in operation. Some of the work completed is as follows:

"Excavation and fill, 6,600,000 cu. yds.; base rock, 570,000 cu. yds.; asphaltic concrete binder course, 940,000 sq. yds.; asphaltic concrete surface course, 1,100,000 sq. yds.; P.O.L.* system consisting of 20 large aboveground storage tanks and high-speed refueling hydrants, 1 lot; airfield lighting, 1 lot; 601 buildings completed with a floor area of 629,000 sq. ft.; 248 buildings under construction with a floor area of 202,000 sq. ft.; 21 warehouses constructed with a floor area of 650,000 sq. ft.; 4 warehouses under construction with a floor area of 280,000 sq. ft.; water lines, 13.5 miles; sewer lines, 6.1 miles; power lines, 33.5 miles; roads, 28 miles.

"At Sidi Slimane, in an area of about 7,000 acres, practically all grading and paving for the runways, taxiways, and aprons has been completed. Housing for four thousand troops with appurtenant operations buildings and utilities have been completed. P.O.L. facilities are in operation. Warehouses are in use. Some of the work completed is as follows:

"Excavation and fill, 3,300,000 cu. yds.; base rock, 490,000 cu. yds.; asphaltic concrete binder course, 1,050,000 sq. yds.; P.O.L. system consisting of large tanks, pipe lines and refueling hydrants, 1 lot; airfield lighting (partially complete); 546 buildings completed with a floor area of 370,000 sq. ft.; 264 buildings under construction (90% complete) with a floor area of 240,000 sq. ft.; 7 warehouses with a total floor area of 190,000 sq. ft.; roads, 17 miles; sewer lines, 4.4 miles; water lines, 4 miles; power lines, 6.8 miles.

"At Ben Guerir grading of the runway has been completed and base course completed on about half its length. Grading is under way on the taxiway and aprons and paving will start in the next few days. The P.O.L. system is well under way.

"At Boulhaut a portion of the access road has been constructed in order to provide an area for testing various types of base course. At present, the work on this base has been shut down pending completion of designs and notice to proceed.

"At El Djema Sahim no work has been done pending completion of plans and notice to proceed.

"The off-base pipe line is under construction, part of the work being done by French contractors.

"A tremendous amount of work has been completed within a short period of time. The costs have not been excessive regardless of the difficulties encountered. We now have our administrative offices consolidated at Nouasseur. Within a few weeks we will have our warehousing consolidated at the same location. This will permit a smoother and more economical operation in the future.

"With the end of the 'crash programs' and the reduction of American personnel now in process, our efficiency should improve, resulting in lower unit costs for the balance of the work.

"Thank you, Mr. Chairman and gentlemen for your attention."

America's free press is one of the greatest protective bulwarks of the free world—of which Washington, D. C., is the capital, journalistically as well as financially and otherwise. Sensational news from Washington, which is abnormally devoured by daily readers and radio listeners in these times of national and international tensions, has included many rightful exposures by congressional committees of misfeasance, malfeasance, and public corruption.

In such a tinder-box atmosphere a spark of scandal flames quickly when, in a public committee hearing, graft, waste or mismanagement of government work is alleged or even suggested —particularly if it is not quickly answered with disproof. In the case of the North African air bases the contractors, with their business reputations at stake, were the last to be permitted to answer the unjust and unfounded charges.

Fortunately, the free press also includes general magazines, which have time to digest and weigh the value of news and to draw well-balanced conclusions. The construction-trade magazines, whose editors better understand the many problems involved, have remained calm, objective, and factual.

Challenge of Truth

The testimony of Bonny and Wilbur, which consumed about eight hours, was too voluminous for full reproduction here, although transcripts of it are in the files of the Atlas partners.

We stand firmly behind the statement in Bonny's committee testimony in which he said:

"We categorically deny that Atlas has in any way been involved in or guilty of fraud or graft in connection with our contract. We deny that mismanagement has existed and we challenge the competency of those who have so accused us."

As Wilbur reported, work in Morocco is proceeding on a satisfactory basis under our contract with the Corps of Engineers, America's oldest and most widely known engineering organization, with which M-K has had satisfactory contractual relations for many years in numerous states, Alaska, and abroad. The rancor that has been generated in the course of this unfortunate public fireworks display has not been between the two contracting parties.

American private business has had to withstand many attacks on its integrity in recent years. To repel them is costly in energy, time and money, but we believe the reader will agree that it is a worthy cause.

*Petroleum, Oils, and Lubricants.

Mexican Firms Build Veracruz-Acayucan Coastal Road

by Edward F. London

• Superintendent for Compania Constructora Union S.A., Hector A. Gaitan, uses Ford pick-up fender as desk as he composes instructions for one of his foremen. Cleared right-of-way awaits grading by scrapers beyond horizon.

• At Michapa, workers hand-bail stream which has been dammed for road crossing. Armco culvert will go in excavation. Masonry abutments will hold it in place.

• One of three International TD-18 crawlers with Bucyrus-Erie hydraulic dozers clears right-of-way 18 kilometers from Acayucan terminus.

Two Mexican contractors are pioneering an all-weather highway south from the important seaport of Veracruz to Acayucan. It is expected that the black-top road—built under exceptional difficulties—will open to traffic, though only partly surfaced, during 1952.

THE problems confronting Mexico's road builders—rising costs, a limited budget, lack of trained construction labor, and unprecedented highway travel—are not unique as to kind. U. S. road constructors are also familiar with these obstacles. It is only their magnitude south of the border that distinguishes them. They are as mountains compared to our mole hills. Nevertheless, Mexico is making substantial progress toward a modern highway system—a venture that didn't even begin until 1925.

Under the direction of the National Highway Department (Direccion Nacional de Caminos) headed by Director General Ingeniero Armando Salinas, with offices in Mexico City, many road building projects are underway throughout the country. The Highway Department is under the jurisdiction of the Secretary of Communications and Public Works headed by Licenciado Augustin Garcia Lopez.

Of course, the first benefits of the new highway construction, will be reaped by the throngs of U. S. tourists, who are visting Mexico in ever increasing thousands, attracted by a favorable rate of exchange and some of the finest scenery in the world. However, the main avowed purpose of the national government in promoting better and more modern highways is the easier and faster transportation of agricultural and mineral products.

All national roads in Mexico are built and maintained by the federal government. However, gasoline taxes do not bring in enough money to construct and maintain the rapidly expanding highway system. The deficiency must be made up by funds from the Treasury Department. As a side commentary it may be noted

here that even with a couple of bad drought years, with lower agriculture production, and higher expenditures for public works, the Mexican government has just closed its fiscal year with a balanced budget.

Besides the national system of roads, there is the federal aid system where each state builds roads on the basis of a 50% contribution by the state and a 50% expenditure by the federal government.

Build Feeder Roads

Recently, a new department has been organized. This is the National Association of Feeder Roads (Vecinales) which is helping to construct a system of roads similar to our farm-to-market system in the U. S. Under this organization the cost of building and maintaining the feeder roads is borne equally by the federal government, the state government, and those private land owners who derive the greatest benefits. Each group pays one third of the cost involved.

Of great importance to both tourists and Mexican agriculture is the new all-weather highway being constructed along the Gulf of Mexico coastal section. It will join Veracruz, Mexico's greatest seaport city, and Acayucan, a point on the Trans-Isthmian highway, which in turn crosses the south bound Pan-American highway.

Only one part of the long-range program by DNC (National Road Department) this new road will open up a large section of Mexico not usually encountered by tourists.

Under the competent direction of DNC resident engineer Armando Ferreira Rios, assisted by field engineer Roberto Palacios, and office engineer Alfonso Agiss, with headquarters at San Andres, Tuxtla, the new road is nearing completion with work being handled by two contractors.

But, into the field office at San Andres Tuxtla, at approximately the center of this construction story, often comes the heart-breaking report, that again a large portion of completed work has been wiped out by tremendous land-slides caused by the excessive rainfall which besieges this area.

You get some idea what these people are up against when you learn that about one-third of the finished work on this road has had to be replaced because of serious wash-outs.

Four years ago the contract for

• Top: One of the Koehring 605 shovels owned by Companie Constructora Union S. A. takes out cut which will slope road into bridge approach.

• Below: Another TD-18 with Bucyrus-Erie blade flattens right-of-way through near-jungle.

• Bottom: DNC (National Highway Department) engineers stake out center line. Contractor's crew stakes out construction lines.

• Top: Near Acayucan, a Bucyrus-Erie S-90 (8-yd. struck) scraper drawn by International TD-18 crawler brings road bed to grade.

• Above: One of the International tractor-Bucyrus-Erie scraper teams pulls borrow out of a pit to build up road.

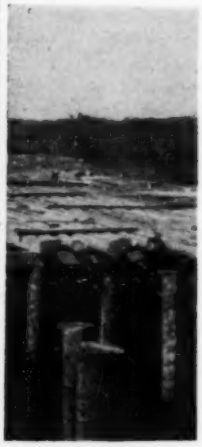
• Below: A Caterpillar D8 with dozer clears part of slide near San Andres Tuxtla. Machine belongs to Federico Higareda Mexico City contractor.

clearing the right-of-way and shaping the road-bed was awarded to Compania Constructora Union S. A., a Mexico City firm, headed by Ingeniero Perfecto Mendez Carpizo.

Under the supervision of Hector A. Gaitan, field superintendent, Union began this work at Angel R. Cabadas, 114 kilometers south of Veracruz, and have pushed it to a point 18 kilometers from the finish line which is the village of Acayucan on the Trans-Isthmian highway—a total distance of 137 kilometers.

The estimated total cost of all construction from Angel R. Cabadas to Acayucan is approximately 20,125,155 pesos ($2,326,607). The job requires the handling of 4,000,000 cubic meters of material (approximately 5,231,493 cubic yards) and is scheduled for completion by the end of 1952.

Gaitan has established field headquarters in a sugar mill at the village



• Left: A Quick-Way truck crane handles pile driving equipment at site of this bridge building operation near Tecolapilla.

• Right: Fill for cave-in repair between Santiago and San Andres Tuxtla is loaded out by Koehring 605 shovel. Contractor Federico Higareda has mostly paving and bridge building work but slide gave him additional job for DNC (National Highway Department).

• Second Left: In this view of bridge construction near Tecolapan, the temporary by-pass bridge and road at left join new road just around curve.

• Left: Close-up of bridge construction shows extent of manual labor as boulder is rolled into place. Abutments are mostly hand masonry.

of Juan Diaz Covarrubias. Here also are located the 30 buildings forming the labor camp and the equipment repair shop which employs 16 men. The camp is almost centered between San Andres Tuxtla and Acayucan where work is concentrated at present.

To get to Union's field office from San Andres Tuxtla, it is necessary to ford the San Juan river where a concrete and steel bridge will be constructed later. Although the crossing is about 200 feet wide, the water is shallow, allowing vehicles plenty of clearance if they stick to the right-of-way, which traces a figure "S" to the opposite bank.

At present most of Union's road machinery is concentrated at points between San Juan and the farthest point of construction, now about 18 kilometers north of Acayucan.

The width of the new road averages 10.50 meters (34.5 feet) shoulder to shoulder. Right-of-way is 40 meters (131 feet) wide, 20 meters from center to each side.

Gaitan and *Excavating Engineer's* representative started the inspection of the job at the farthest point of construction. This necessitated a rough trip in Gaitan's Ford pick-up over a parallel by-pass road cut from dense jungle. This road is also used by the bus line connecting Veracruz and Coatzacoalcos. The regular roadway under construction, was impassable for anything except earth moving equipment, because of recent rains.

Rough Ride to Site

An hour's bumpy ride brought us to the clearing operation, which is being performed in one area by three International TD-18 crawlers wielding Bucyrus-Erie hydraulic bulldozer blades. Here the jungle is dense with tangled vines, matted thickets and many large trees which have to be cleared from the right-of-way.

The International Crawlers work across the roadway in 80 to 100 foot passes, bulldozing trees and debris off the edge of the staked area. When the trees and underbrush have been removed, the dozers make another run to grade off several inches of topsoil.

These dozer operators were getting the trees out in a hurry, by going in with blade high exposing the roots. Then they lower the blade far enough to edge under the roots and push the tree off the edge of the clearing area. Weather permitting, these three dozers were clearing about 20,000 square meters (23,920 sq. yds.) in two 12-hour shifts. But, when it rains, production lags. With only about two months dry season a year, it is easy to see why construction jobs take a little longer in this country.

Gaitan gives each bulldozer operator

plenty of working room and makes him responsible for clearing a certain section.

Stake Out Highway

When a section has been cleared, DNC engineers run their center line with stakes cut from small trees, shaved flat on one side for grade data. The contractor does his own staking for right-of-way 20 meters each way from center line. He also stakes his shoulder cuts, etc.

After inspecting the clearing operation, Gaitan drove his pick-up north about a quarter of a mile, where scrapers were busy building roadbed from material obtained at the edge of the right-of-way.

Here, straight grade gave Union an opportunity to move along at a more rapid rate. Shaping the road-bed here is not too complicated. Seven Bucyrus-Erie S-90 10-yd. scrapers pulled by International TD-18's take borrow from both sides of the clearing and deposit their loads on the staked road-bed. The material here is a reddish clay which resembles Georgia mud when wet. However, the scrapers were making good time, biting deep, and getting loaded in a hurry.

When the clay has been spread, TD-18 International dozers with Bucyrus-Erie blades level to grade. Specifications do not call for compaction. However, the clay was packing well under the transit of equipment.

At this point, the operators seemed to be working efficiently, with equipment well spread out on a short loading operation. Making borrow passes about 100 feet long before mounting the roadbed, two scraper units were working together in each section. One scraper was usually dumping on the road while the other was excavating.

After checking the scraper operation, Gaitan moved north to a point near Michapan where excavating equipment and hand labor were busy preparing the approaches for a new bridge. Here a branch of the San Juan river crosses the roadway.

To keep within specifications which call for grades no more than 5% maximum, it was necessary here to cut down some high ground on the south side of the river in order to match the grade on the approach from the north, which was finished.

A Koehring 605 shovel, powered by D13000 Caterpillar Diesel and swinging a 1½-yd. AMSCO dipper, was digging the fairly dense material.

Working round the clock, lighted at night by floods, the Koehring was loading 6-yd. Ford end-dumps, which were hauling the material to fill low spots on the road to the south. Here it was necessary to swing each dipperful on an arc of 180°, to the trucks spotted at the rear of the shovel. Gaitan suggested to his foreman here that the shovel be moved to one side of the cut so that only a 90° swing would be necessary.

Bail Out Excavation

A couple of hundred feet north of this excavating work, about 15 men were busy hand-bailing a small amount of water from the bridge site, with open-top 5 gallon cans. Gaitan indicated that ordinarily he would have installed a pump here, but the labor was available at that time, and the pump was not. Steep side slopes through the cuts are side-dressed by hand-labor, but wherever possible this work is done by an Adams motor grader. The machine also levels fill on the new roadway and cuts down ruts on the by-pass roads, where busses haul passengers to Coatzacoalcos.

Gaitan's crew approximates 130 men, including foreman for each operation. The whole gang is fairly well concentrated at present within an area of 20 kilometers between Hueyapan and a point about 18 kilometers from Acayucan.

The new highway travels through very beautiful, dense, and wild jungle country, crosses flat plains and cuts through steep mountain slopes. Many small rivers cross the right-of-way, and this necessitates some coventional bridge building as well as the construction of culverts for the smaller streams. From San Andres to Acayucan required the installation of 160 Armco pipe sections ranging in diameter from 0.61 to 1.22 meters. The .91 meter pipe is the one most used.

Excavating for the smaller culverts is done by hand labor, but on the larger cuts a Caterpillar D8 bulldozer takes care of this job.

When the excavation is completed for the small culverts, and the bottom of the ditch has been leveled, the sections of Armco pipe are placed in position by hand labor. While this is going on, a masonry wall is erected at each end of the cut where it joins the roadbed. The wall is constructed of large rock, cemented together by hand-mixed concrete. Usually it is about 3 or 4 feet thick. When the concrete has set hard enough, bulldozers, working from each end simultaneously, backfill between the wall and the roadway. Gradually, the fill is pushed out over the Armco pipes, and is compacted by the transit of the bulldozers.

When the fill has been built up enough to hold the weight, Bucyrus-Erie scrapers dump fill over the area, which is then leveled by the D8's and the Adams motor grader.

On the larger bridges, after excavation is completed, forms are built on the job for the construction of arcs. After completion of the forms, hand mixed-concrete is placed in lifts. When concrete has set, forms are removed. Backfilling D8's and Bucyrus-Erie scrapers then complete the operation. Gaitan said he would like to have some sheepsfoot rollers in order to compact backfill at these stream crossings, but equipment of this type is hard to get in Mexico.

Union's shovel operators earn 22.50 pesos ($2.60) for a 12-hour stretch plus a bonus of .05 centavos ($.0058) a cubic meter (1.3 yards). Tractor operators draw 14.00 pesos ($1.60) for 8 hours, plus a bonus of 1.00 peso ($0.12) for each hour of actual working time. Hand workers get 4.20 pesos ($0.485) for 8 hours, 6.30 pesos ($0.73) for 12 hours.

All equipment operators are working 12-hour shifts, 30 days a month. Hand labor works 6 days a week with Sunday off. Gaitan wants to increase his force, but construction labor is scarce in this agricultural section.

So far, said Gaitan, there has been no serious accident on the job. The

• Below top: Near Alvarado, paving has been completed and drainage ditches are being prepared on grades where necessary. Ditch is excavated by hand, stones laid in excavation and one course of grout is applied.

• Below bottom: Completed drainage ditch—surplus rocks will be picked up and hauled where needed to build more ditch.

• Superintendent Gaitan looks over new road bed near Michapa. Fill was built up by truck haulage.

• Here is the fuel supply storage for the forces of Contractor Higareda.

• Contractor-built gravel screen serves only suitable deposit along entire length of new road. It is located near Tecolapa.

minor accidents that have occurred were due to inexperience by the hand-workers. Constructora Union retains a local doctor in each town near the construction area, on a fee basis to take care of all first aid requirements.

When this job was surveyed by the writer, no drilling or blasting was going on due to a shortage of drill shafts, but plenty of this work has been performed on several of the cuts.

Drilling when necessary is handled by a battery of 8 Worthington WJ-45 rock hammers, powered by 2 Worthington 210 air compressors. In addition, about 20 men usually assist with hand drilling.

Holes go to a depth of 6 meters. If the bed is deeper, a lift is shot, and the operation is repeated.

The material encountered in the drilling operation is usually conglomerate of volcanic origin. Sometimes the drill crews run into harder monolithic formations under the clay overburden.

Holes are spaced on 3-meter centers. Mostly Timken bits are used.

Both granulated dynamite and 40% gelatin furnished by Cia Mexicana de Explosives is loaded in the holes. Charges are connected in series with 6-meter copper wire, and then electric blasting caps are detonated by a battery.

Greasing of equipment is performed by hand operated Alemite equipment, mounted on a flat-bed truck. Union hauls Gulf Diesel fuel and lubricants from the Petroleos Mexicanos plant in Coatzacoalcos.

Gaitan says he expects to finish the contract about the middle of 1952. And if hard work and ingenuity in overcoming handicaps means anything, the job is licked.

Far to the north, paving now going on between Alvarado and San Andres Tuxtla is being performed by contractor Federico Higareda, C., Mexico City. This firm is also taking care of several bad slides between Tecolapan and San Andres Tuxtla.

One of the slides caused by erosion between Santiago and San Andres Tuxtla, had narrowed the road to only car width. Since this slide is on a curve, and the only route for traffic, repair progress is necessarily slow. On the west side of the curve many yards of material had broken away, leaving an almost sheer precipice of several hundred feet. Fortunately, there was enough bench left on the inside of the curve to form a foundation for the large amount of fill necessary.

Repair Slide

At the south end of the curve, a small hill of clay about 25 feet above road grade was being cut down to furnish fill for the new section of road. First, the hardpan was being loosened with a Cat D7 and LeTourneau ripper using two teeth. After enough material had been scarified, the crawler picked up a Caterpillar 12-yd. scraper and a LeTourneau blade. It then hauled the material to fill the section which will be about 80 feet wide at this point.

Juan Padilla, headquartering at Tecolapan, is general superintendent for Federico Higareda. He is responsible for the 137 kilometers of new paving, the replacing of the road where three bad slides have recently occurred, and the building of two new bridges over swift water.

When this writer visited this end of the job, Padilla was trying to open up the road which hangs high on a mountain over Santiago de Tuxtla. This was a rough task made tougher by much rainfall.

As the road had been almost completely destroyed for a distance of several hundred feet, it was necessary to form a new roadway by cutting back about 80 feet into the mountain side. Always there was the danger that the whole thing might slide down into the deep valley below.

As he could only approach the slide from the north, and as there was not much working room, Padilla could use only one shovel, a Koehring 605 with a 1½-yd. dipper. This equipment excavated a narrow passage through the gumbo, so that bus and auto traffic could get through.

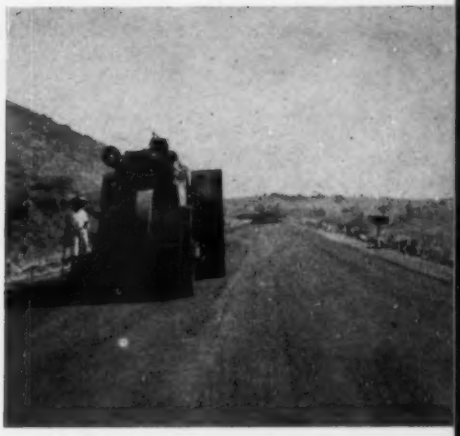
However, there were many interruptions as the busses got stuck and had to be helped through by the Caterpillar D8 dozer. A Caterpillar 12 maintainer helped keep the road open for traffic.

After a passage had been cut for traffic, the Koehring shovel moved down the hill a short distance to excavate selected material for placing on the drop side. This fill will take up about 30,000 cubic meters of material.

The Koehring loaded 4 and 6-yd. Ford end-dump trucks which were often held up by traffic before getting a chance to dump.

Several small benches on the drop

• A Caterpillar Model 12 maintainer mixes asphalt paving in place. Rosco-Minneapolis asphalt spreader works just beyond.



• Huber rollers smooth surface. Asphalt is shipped from Tampico to Veracruz to Alvarado.

side helped to anchor the material in place, but, of course, many yards of dumped material kept on sliding down the slope. These slides have occurred where the road has been finished except for final paving. Therefore, they did not cause loss for the contractor.

Just south of this slide and toward San Andres Tuxtla, Federico Higareda operators were rolling and compacting a course of selected fine gravel with steel-wheeled Huber rollers powered by Hercules DJXH Diesels. Tampo "wobble-wheel" rubber tired compactors drawn by Allis-Chalmers tractors were also working the gravel layer. When the material gets too dry, (which is not often in this country) it is moistened by 2,000-gallon tank wagons on Ford chassis.

This treatment is making a very smooth finish on the road-bed. It appears to be a good foundation for the asphalt topping to come later.

Most of the gravel pit operation seems to be performed by hand. On the pit side of the road a screen, crudely constructed of local trees has been set up against the side of a hill. This arrangement allows the gravel to be dumped on top of a hopper which loads to trucks underneath. On the opposite side of the road, laborers with shovels were loading sifted gravel to subcontractor dump trucks.

Tecolapa is the supply base and equipment repair center for Higareda. Under the supervision of the mechanic, the equipment is repaired in the open along both sides of the road.

North of Tecolapa, Higareda is building a bridge across a very swift stream. A temporary wooden bridge has been installed upstream, while the masonry foundation work is progressing on the permanent bridge with hand-labor. This bridge will be about 22 meters long when finished.

Road Courses

From this point to Alvarado, the firm is placing base course and asphalt topping. This operation is performed in six layers as follows:

1—base course
2—20 centimeters of gravel—rolled
3—20 centimeters of gravel—rolled
4—5—6—Asphalt aggregate mixed in place and rolled with Huber rollers.

One of the real problems facing DNC and contractors is the delivery of asphalt when needed. This material is shipped from Tampico through Veracruz by a railroad which runs parallel to the road approximately 20 kilometers (12.5 miles) west. The asphalt is hauled by truck to the contractor's plant at Alvarado. A shortage of railroad cars is the contributing bottleneck

The base and sub-base courses are fine-screen, selected gravel hauled from the pit near Tecolapa in dump trucks. It is placed along the edge of the roadbed where men with shovels build up the material into V-shaped piles for the next step on the job.

Then a Caterpillar Model 12 maintainer spreads the gravel across half the roadway, while traffic uses the other half. This is then compacted with Huber rollers at the rate of about one kilometer per day per roller. Near Alvarado, three of these rollers were at work. When okayed by DNC engineers, the operation is repeated on the next stretch to the south.

After the first course has been pretty well smoothed by rolling and traffic, dump trucks again deliver fine gravel which is usually placed in the center of the road in piles averaging about 18 inches in height. This material is then shaped by Caterpillar maintainers with the edge of the blade set so that a neat mound several hundred feet long is formed.

Then, Rosco-Minneapolis asphalt spreaders mounted on Ford chassis deposit asphalt on top of the gravel. Although the firm has 12 of the spreaders on the job, only a couple were in operation here due to a shortage of asphalt.

When the asphalt has been poured, the two Caterpillar maintainers blade the material up one side and down the other, moving the mound of gravel and asphalt back and forth until it is properly mixed. A half dozen passes usually do the trick. Then the graders spread the material over one-half of the roadbed to specification depth.

It is expected that paving will be finished from Alvarado to San Andres Tuxtla this year. A shortage of funds will not permit the placing of asphalt paving from San Andres Tuxtla to Acayucan until later. However, an all-weather gravel road will be in operation by the end of 1952.

So far, the average cost of this project has amounted to approximately 80,000 pesos per kilometer ($11,200 per mile) although the cost varies for each kilometer according to the difficulties of terrain encountered.

● Hull Island in the Hull-Rust mine contained an estimated 172,157 cubic yards of rock. It had to be removed to get at the underlying iron ore vein.

161,888-Pound Single Blast Features Safety Precautions

by C. E. Shea*

A safety supervisor explains how a 172,157-cubic-yard island of rock was shot in a single 161,888-pound blast with maximum safety precautions. This talk was presented at the recent National Safety Council meeting in Chicago.

THIS concerns the blasting of an island of rock in the Hull-Rust Mine at Hibbing, Minn., operated by the Oliver Iron Mining Co., a subsidiary of U. S. Steep Corp. Although large quantities of explosives are used in our open pit operations, the 161,888 lbs. used in shooting this island was by far the greatest amount used in a single blast up to that time.

The mine, which is an open pit operation, mining iron ore, extends over 760 acres. It adjoins similar operations of four other companies on the north, east, southeast, west, and southwest, the entire excavation being one-half mile to a mile wide and three and one-quarter miles in length, the entire area extending over 1,450 acres.

The rock island, known as the Hull Island, was located near the west end of the Hull-Rust Mine and covered an area of approximately two and three quarters acres. The top of the island consisted of a cherty taconite from 30 to 65 feet deep. Below this occurred a layer of paint rock averaging 20 feet in thickness, and at the bottom were from 5 to 15 feet of ore. The island was estimated to contain 172,157 cubic yards of rock, all of which had to be removed to get at the ore underneath.

There are several reasons why it was decided to blast the island all at one time:

1. The location and structure of the island made it very favorable from the standpoint of safety. The island was not near other operations and the layer of soft ore under it would serve as a cushion for the blast.

2. Better breakage would be assured by one large blast instead of several smaller blasts.

3. Drilling cost would be less, due to better and easier location of the holes at one time.

A large amount of preparatory work had to be done before drilling could be started on top of the island. A road had to be established up which the drills could be moved and which would serve as a means of access for supply trucks. All the ore had been cleaned off the top of the island several years ago, leaving a very irregular surface. Some grading and leveling of this surface had to be done so that the drills could be readily moved from one location to

*Safety Supervisor, Oliver Iron Mining Co., Hibbing, Minn.

another, and to allow the supply trucks to get to them.

It was also necessary to provide roads to some of the lower benches on the sides of the island. This rock was drilled by means of jackhammers supplied by portable air compressors. After blasting, a bulldozer was used to make the grade for the road.

Pipe-In Water

The access road to the top of the island was very steep. Because of this, it was decided not to haul water for the drills in tank trucks, but rather to run a 2 in. pipe line from the mine water discharge line about 2,000 feet distant. This assured the drills of a constant supply of water and eliminated the hazards of operating tank trucks on the steep grade.

For later disposal of the rock to be blasted, a 10-acre area in the pit west of the island was cleaned off.

After the preparatory work was completed, three blast hole drills were moved onto the top of the island and drilling was started on June 8, 1950. One of these drills was a Bucyrus-Erie 29-T and the other two were Bucyrus-Erie 42-T drills. All were equipped to drill 9 in. holes. The drilling was done on a single-shift basis. A record was kept during the entire drilling period by one man whose duty it was to get sufficient data so that an accurate comparison of costs could be made between the two types of drills. It was also his duty to see that all safety rules were followed.

Drill holes were spaced on 24 ft. centers, except where this was not possible due to the rough ground. An electric timer was to be used in firing the blast, and for this reason the holes had to be laid out carefully so there would be no interference between the fifteen delay circuits and to eliminate the danger of cut-off holes. The drilling was completed on Oct. 12, 1950.

Drill Performance

A total of 189 9 in. holes were drilled. These holes varied in depth from 30 to 65 feet, depending upon the depth of the overlying taconite, as the holes did not extend down into the paint rock layer. A total of 9,129 feet of 9 in. hole was drilled. Of this total 6,857 feet were drilled by the 42-T drills and 2,272 feet by the 29-T drill. The number of drill bits used was 1,627. The 42-T drills averaged 4.6 feet of hole per gross hour during the entire period and the 29-T drill 3.1 feet per gross hour. The average footage obtained per bit from

• Below: General view shows rock island at moment of blast.

the 42-T drills was 5.90 feet and from the 29-T drill was 4.88 feet.

The loading of 161,888 lbs. of explosive into the holes, which required several days, was completed the day before the blast. This is contrary to the usual practice in this district, which requires that holes be shot the same day they are loaded; but under the existing circumstances it was not possible to adhere to the rule. During the loading of the holes, a safety inspector was assigned to duty on the island in connection with the work.

The bottom charge used was Nitramon A (8½ in. by 18 in., 49 pounds per can) because the rock at this point was softer. The upper thirty feet was hard taconite, so Nitramex (8½ in. by 18 in., 62 pounds per can) was used in this location. All holes were loaded with four cans of Nitramex in the upper portion. The amount of the bottom charge varied as to the depth of the hole and the yardage of material to be broken. In the deeper holes small cans of 6 in. by 24 in. Nitramon No. 2 were used to insure a continuous charge in place of deck loading. It was felt that by loading the holes in this manner there would be less danger of cut-off holes due to the firing of the earlier delay circuits. A loading factor of 0.94 lbs. of explosives per cubic yard of material was used.

Two primers were used in all the holes, with a third one added in the deeper holes. Wire-bound primacord was used for the down lines and reinforced primacord was used in the trunk lines. It rained several times while the holes were being loaded, wetting nearly all of the primacord. For this reason it was decided to attach primacord primers to all the down lines. These primers were added to make doubly sure that each hole would be detonated. It required 24,000 feet of primacord to connect up this blast.

Gravel Stemming

Gravel was used for stemming material. It was loaded into dump cars by a clamshell, hauled down to a point near the island, transferred to trucks by a clamshell, and hauled to the top of the island. Because of the steep grade, it was necessary to use a tractor to help the loaded trucks up onto the island. This same precaution was necessary for the powder company trucks which delivered the explosives to the island.

After all the holes had been charged and stemmed, the next thing to be done was to establish the fifteen delay circuits. Tentative circuits had previously been laid out on a map in the office. In order to transfer this information to the area to be blasted, ordinary twine was used. The twine was laid out on the ground as indicated on the map. If any changes were required, the twine was shifted, and when the circuit was found to be satisfactory, the primacord trunk

• C. E. Shea, Safety Supervisor, Oliver Iron Mining Co., Hibbing, Minn.

line was laid in the same position as the twine. The same procedure was followed in laying out all fifteen of the circuits. It was decided that the firing interval between each circuit would be 15 milliseconds.

As soon as the primacord trunk line for each circuit was in place, it was connected to the down lines for each hole. When this work was completed for all the circuits, all the exposed primacord was covered with gravel to lessen the sound made when it was detonated. The same gravel was used for this as for stemming; in all, 210 yards of it were required.

A steel safety house was placed north of the island about 200 feet from the location of the fifteenth delay circuit. The electric blasting timer switch was placed inside the house, for protection. A railroad tie was placed between the safety house and the toe of the island. A second tie was placed approximately parallel to the first near the crest of the road up onto the island. Thirty-two railroad spikes were driven into each tie at approximately equal intervals. The two center spikes on each tie were marked No. 1. The two spikes on each side of the No. 1 spikes were marked No. 2, and so on until the end spikes were reached. These were marked common.

The wiring of the shot could then be started. Beginning at the timer switch, a wire was run to a No. 1 spike on the nearest tie, wrapped once around this spike, then to a No. 1 spike on the tie near the crest of the road, wrapped once around that spike, then across the top of the island to one end of the primacord trunk line for No. 1 circuit. This circuit was on the far side of the island from the timer.

Leave Trunk Lines Open

A second wire was started at the timer switch, run to the second No. 1 spike on the nearest tie, wrapped once around this spike, then to the second No. 1 spike on the tie near the crest of the road, wrapped once around that spike, then across the top of the island to the opposite end of the primacord trunk line for No. 1 circuit. At this time neither of the No. 1 wires was connected to the primacord trunk line for No. 1 circuit. The remaining 14 delay circuits and the common circuit were wired in a similar manner.

There were two reasons for using the railroad ties in the manner described: first, the wiring was made easier and there was no chance of crossing wires; second, attaching the wires to the ties prevented pulling and breaking of the later circuits by those firing first.

The last thing done on the day before the blast was to connect the 220-volt power line between the timer switch and the main power switch. The latter switch was located in another steel safety house about 1,000 feet west of the island. The circuit was tested between the two switches and found to be all right. Two cables in parallel were used to insure that power would be supplied the timer switch long enough for it to complete the cycle. A watchman was assigned to the area on each of the last two shifts with instructions

to allow no one to enter the area.

On the morning of the 14th of October, the day of the blast, electric blasting caps were attached to each end of each delay circuit and to the common circuit. The caps were buried at a safe distance from the loaded holes. Power was applied to the timer as if the blast was to be set off. This exploded the blasting caps and indicated that the circuits up to the primacord trunk lines were in good order.

Tie Pigtails in Circuit

Next, thirty sets of pigtails were made by cutting short pieces of primacord and taping them to two No. 6 electric blasting caps wired in series. A pigtail was wired to each end of each delay circuit and to the common circuit. This completed the blasting circuits as far as primacord trunk lines. About one hour before the time scheduled for the blast, the pigtails were connected to the primacord trunk lines for each circuit by simply tying square knots. This completed all the wiring required to explode the blast.

It may be well to mention at this time that just before the final connections were made, three or four primacord boosters were connected into each wire of the common circuit. For example, one booster was put in each common circuit between the connections for No. 3 and No. 4 delay circuits. The purpose of these boosters was to cut off the part of the common wire which connected delay circuits already exploded so as to prevent any chance of this wire pulling and breaking circuits which had not exploded.

Several days prior to the day of the blast, a meeting of the powder company representatives, the general superintendent of the district, the assistant general superintendent, the superintendent and assistant superintendent of the Hull-Rust Mine, the drill and blasting foreman, and the safety supervisor was held in the office of the general superintendent, at which time detailed procedure was agreed upon for setting up protection for the blast, and firing it.

The following day, all mining companies with operations adjacent to the Hull-Rust Mine were notified of the exact time the blast would be fired. They were then in a position to take whatever steps they felt necessary to protect their employees.

A notice was placed in the local daily paper the day of the blast, the 14th of October, advising the public that a blast was to be made sometime between 3:30 PM and 4:00 PM. This was done to keep people from being unduly alarmed in case there was more noise and vibration than expected.

Up to now, no mention has been made of the precautions taken to clear the area surrounding the island before the blast was fired. Acting upon the advice of the powder company representatives, it was decided not to allow anyone to remain within 2,000 feet of the blast, with the exception of those directly connected with firing the blast, as they would be protected by a steel safety house. The reason for selecting this distance was to leave no doubt that all personnel would be out of range, in case one or more of the holes would blow out sideways when detonated.

The day before the blast, the 12 pit foremen and safety inspectors who were assigned to clear and guard the area, as well as the drill and blasting foreman, were assembled at the Hull-Rust Mine office to receive instructions. At that time they were informed that the blast was to be set off at 3:45 PM the following day. All workmen on the 7:00 AM to 3:00 PM shift would cease work at 2:30 PM and leave the area, and all personnel reporting for the 3:00 PM to 11:00 PM shift were to be kept out of the mine until the blast was over. No locomotives, speeders, trucks, etc., were to enter the mine after 2:30 PM. Each of the assembled pit foremen and safety inspectors were assigned a definite area to guard and were given detailed instructions for clearing their respective areas.

The drill and blasting foreman, who with the mine superintendent, was to be on the island to check the clearing of the entire area, was given a yellow flag, and the 12 men who were to guard the blast area were each given a white flag. They were instructed that the entire area was to be cleared at 3:15 and each man, after clearing his area, was to take a station from which he could see the island. At 3:20 PM the drill and blasting foreman, standing on top of the island, would wave his yellow flag. In turn, each of the men guarding the area, having his area cleared, would reply by waving his white flag. When the two men on the island accounted for all the white flags, indicating that the entire area was cleared, the yellow flag on the island would be waved the second time to indicate that such accounting had been made.

Each man was to be given a red railroad flare so that if anything developed after the second yellow flag signal from the island, he could light the flare and the firing of the shot would be postponed until whatever was wrong had been corrected. In order that there could be no mistake as to when the shot had finally been fired, all were instructed that the entire area was to be guarded until the siren at the Hull-Rust Mine headquarters was blown, which would be the signal that the blast was over.

Because of the men guarding the area and those firing the blast being

• Notice excellent rock fragmentation in this picture taken immediately after blast.

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great distances apart, it was important that the entire schedule be followed rigidly. To assist in accomplishing this, the watches of all men taking part were to be synchronized with the electric clock in the Hull-Rust Mine office the following day.

At 2:00 PM the day of the blast, the assistant superintendent checked to see that all watchmen were in their assigned places. At this time each man was given a railroad flare and a typewritten sheet containing the instructions given the previous day.

On the afternoon of the blast, the only persons to go up on the island, after all wiring and checking was completed, were the superintendent and the drill and blasting foreman. At 3:20 PM, exactly, this foreman signalled with his yellow flag to attract the attention of the men guarding the area. These men, having satisfied themselves that their respective areas were clear, began waving their flags and continued to do so until the drill and blasting foreman waved his yellow flag the second time, indicating that he had gotten flag signals from all 12 men and that the entire area was clear.

At 3:30 PM, the superintendent and the drill and blasting foreman left the island and went directly to the steel safety house where the main power switch was located, about 1,000 feet west of the island.

At exactly 3:45 PM, the time set for the blast, the power switch was thrown on and held for ten seconds to insure that the power was not cut off before the electric timer had completed making the contacts to energize the fifteen blasting circuits, and the blast was over.

Examination of the area around the island after the blast showed that no material was thrown further than 200 feet, and this was only a small amount.

There was very little vibration caused by the blast, and only a moderate amount of noise. The timer, located only 200 feet away, was only moved slightly. For those who expected to hear a great deal of noise and see material thrown great distances and feel intense vibration, the blast was a disappointment. This was the result we hoped to attain.

In loading out the blasted rock, fragmentation was found to be very good and no secondary drilling or blasting was required.

News from the Field

Road Tax Diversion Issue Comes Up in November

Proposed state constitutional amendments dedicating highway-user tax revenues to highway construction and maintenance purposes will appear on the November general election ballots this year in three states; Alabama, Arizona, and Georgia.

The Arizona measure would prohibit the diversion of gasoline tax funds to nonhighway purposes. It specifically exempts the State Highway Patrol and the *Arizona Highways* magazine, which are now supported from road funds, but is designed to prevent any new drain on the state's highway construction revenues.

Alabama's proposed amendment is similar to a model anti-diversion amendment recommended by highway groups but specifically excludes pump taxes as well as a vehicle-use tax in lieu of a sales tax.

The Georgia proposal requires that appropriations for highway purposes shall not be less than motor fuel and motor vehicle license taxes received during the preceding fiscal year.

In contrast to the anti-diversion proposals, Florida's electorate will vote in November on a proposed state constitutional amendment which would earmark receipts from motor vehicle registration fees for school building purposes for 30 years.

Adoption of the Alabama, Arizona, and Georgia proposals would bring to 24 the number of states with constitutional amendments completely or partially prohibiting the use of automotive tax receipts for nonhighway purposes.

The 21 states now having such anti-diversion amendments are California, Colorado, Idaho, Iowa, Kansas, Kentucky, Maine, Massachusetts, Michigan, Minnesota, Missouri, Nevada, New Hampshire, North Dakota, Ohio, Oregon, Pennsylvania, South Dakota, Texas, Washington, and West Virginia.

Anti-diversion amendments failed to receive sufficient votes for adoption in Oklahoma and Tennessee at the 1950 general election. Such amendments were unsuccessfully proposed this year in the legislatures of New Jersey, New York, and Rhode Island.

Soaring Birth Rates to Mean Construction Boom

The huge element of population that depends upon the construction industry for its livelihood can take great comfort from the booming birth rate in this country, says Thomas S. Holden, president of F. W. Dodge Corp., construction news and marketing specialists.

Writing in *Architectural Record*, Holden reviews birth trends in relationship to construction trends, going back to studies of 20 years ago.

By means of statistics Holden established that birth rates and construction rates will invariably move closely together.

"Population growth is obviously a stimulator of construction demand in a dynamic society like ours," he says. "The 1930-40 decade had a little over half the number of new persons that were added in the previous decade; it had a 58% decrease in number of new non-farm dwelling units and a 38% decrease in total construction volume.

"The 1940-50 decade had a 116% increase over the depression decade in number of new persons added to population; it had a 115% increase in new non-farm dwelling units and a 33% increase in total construction volume.

"The immediate building program for wartime and postwar babies," Holden says, "is a school building program which has already reached boom proportions and promises to continue at boom levels for quite a spell ahead."

He says the school-age population, age five to 17, is expected to move upward from 31.6 million in 1950 to 43.1 million in 1960.

"Just now the elementary schools are booming and they will continue to boom through 1958, perhaps longer if the birth rate holds up. The high school boom will definitely carry over beyond 1960 and then will come the turn of the colleges," Holden states.

"Along with the schools and the bigger and better houses will come demands for community facilities of all kinds, public and private."

Lake Superior Miners Receive Safety Awards

Thirty-seven iron ore mines and companies and 27 Michigan miners in the Lake Superior iron ore district have been awarded Certificates of Honor by the Joseph A. Holmes Safety Association for exceptional safety records in the minerals industry during the past year.

Approval of these awards was voted recently by the association at its annual meeting in the Interior Department Building in Washington, D. C. Of 550 recommendations received during the year from operating companies, national associations, and individuals, 416 award winners were selected.

Dr. Joseph Austin Holmes was the first director of the Bureau of Mines. The organization was formed in 1916 to commemorate and further his work in promoting safety in the minerals industry. The present director of the bureau, J. J. Forbes, sponsors the association's program, and is president of the organization by virtue of this office.

The following metal mines and min-

• This Caterpillar scraper proved equally adept at carrying blood donors as it does earth. These employees of H. O. Penn Machinery Co., Inc., New York, N. Y. recently made a group donation.

• This African native (right), fresh from interior is learning to use Bucyrus-Erie 15-B dragline. Scene is at French diamond mine aided by $3,550,000 from Mutual Security Agency.

ing companies have been awarded Certificates of Honor:

Minnesota: Portsmouth Mine, Hanna Iron Ore Co., Crosby; Morton mine, Morton Ore Co., Hibbing; Canisteo district, Oliver Iron Mining Division, Coleraine; Canton open-pit mine, Oliver Iron Mining Division, Biwabik; Fraser mine, Oliver Iron Mining Division, Fraser; Gross-Marble open-pit mine, Oliver Iron Mining Division, Marble; Mt. Iron crushing plant, Oliver Iron Mining Division, Mt. Iron; Mt. Iron open-pit mine, Oliver Mining Division, Mt. Iron; Pioneer mine, Oliver Iron Mining Division, Ely; Sibley underground mine, Oliver Iron Mining Division, Ely; Soudan mine, Oliver Iron Mining Division, Soudan; Spruce open-pit mine, Oliver Iron Mining Division, Eveleth; Virginia crushing plant, Oliver Iron Mining Division, Virginia; Trout Lake concentrator, Oliver Iron Mining Division, Coleraine; Albany open-pit mine, Crete Mining Co. (operated by Pickands Mather & Co.), Hibbing; Bennett open-pit mine, Bennett Mining Co. (operated by Pickands Mather & Co.), Keewatin; Bennett underground mine, Bennett Mining Co. (operated by Pickands Mather & Co.), Keewatin; Biwabik open-pit mine, Biwabik Mining Co. (operated by Pickands Mather & Co.), Biwabik; Corsica open-pit mine, Corsica Mining Co. (operated by Pickands Mather & Co.), Corsica; Embarrass open-pit mine, Lake Mining Co. (operated by Pickands Mather & Co.), Biwabik; Erie preliminary taconite plant, Erie Mining Co. (operated by Pickands Mather & Co.), Aurora; Mahoning open-pit mine, Mahoning Ore & Steel Co. (operated by Pickands Mather & Co.), Hibbing; Sagamore open-pit mine, Sagamore Ore Mining Co. (operated by Pickands Mather & Co.), Riverton; Scranton mine, Hoyt Mining Co. (operated by Pickands Mather & Co.), Hibbing; St. Paul mine, Republic Steel Corp., Keewatin; and Stevenson mine, Republic Steel Corp., Stevenson.

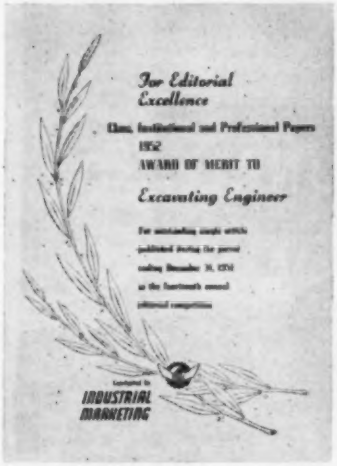
Michigan: Athens mine, The Athens Mining Co., The Cleveland-Cliffs Iron Co. (operating agents), Ishpeming; Gogebic district shops, Oliver Iron Mining Division, Ironwood; Surface operations, Geneva underground mine, Oliver Iron Mining Division, Ironwood; Peterson mine, Puritan Mining Co. (operated by Pickands Mather & Co.), Bessemer; Plymouth open-pit mine, Plymouth Mining Co. (operated by Pickands Mather & Co.), Wakefield; Volunteer open-pit mine, Palmer Mining Co. (operated by Pickands Mather & Co.), Palmer; Davidson mine, Western Mining Co. (operated by Pickands Mather & Co.), Iron River; Anvil-Palms mine, The Youngstown Mines Corp. (operated by Pickands Mather & Co.), Bessemer; Newport mine, The Youngstown Mines Corp. (operated by Pickands Mather & Co.), Ironwood; Tobin mine, Republic Steel Corp., Crystal Falls; and Richmond mine, Richmond Iron Co., Palmer.

The following Michigan iron ore miners associated with the Cleveland Cliffs Iron Co. have been awarded certificates of honor for their exceptional safety records for the following years of work in and/or around mines without losing time because of an accident: Earnest A. Allen, Ishpeming, from 1907 to 1949; Axel E. Carlson, Ishpeming, from 1905 to 1950; William K. Carlson, Ishpeming, from 1899 to 1951; John Cleven, Ishpeming, from 1895 to 1944; William Cornish, Ishpeming, from 1898 to 1950; Earnest Decaire, Ishpeming, from 1902 to 1951; Henry Heiser, Negaunee, from 1890 to 1942; Jalmer J. Hendrickson, Republic, from 1905 to 1948; William Hooper, Negaunee, from 1886 to 1945; Gust A. Johnson, Ishpeming, from 1905 to 1948; John M. Johnson, Ishpeming, from 1900 to 1950; August Jokinen, Negaunee, from 1903 to 1949; William H. Kennaugh, Ishpeming, from 1887 to 1940; Patrick Kennedy, Ishpeming, from 1897 to 1949; John Kermode, Ishpeming, from 1898 to 1944; Jacob Kivisto, Ishpeming, from 1905 to 1947; Ludvig A. Lee, Ishpeming, from 1903 to 1950; John Lenten, Negaunee, from 1905 to 1948; Kuisti Mantela, Ishpeming, from 1901 to 1947; Fred H. Matthews, Ishpeming, from 1900 to 1951; John Nichols, Ishpeming, from 1902 to 1951; Thomas D. Osier, Detroit, from 1889 to 1944; William Reine, Ishpeming, from 1906 to 1950; Thomas Richards, Ishpeming, from 1895 to 1947; Camelo Russo, Negaunee, from 1909 to 1949; William Tobin, Ishpeming, from 1897 to 1946; Wilfred Tousignant, Sr., Gwinn, from 1905 to 1949.

The 416 awards made by the Joseph A. Holmes Safety Association for exceptional safety records and outstand-

ing success in supervisory work included certificates for 159 individuals, 98 coal mines and companies, 77 metal mines and companies, 53 petroleum plants and companies, 11 cement plants and quarries, six nonmetallic mines and companies and four miscellaneous companies in the United States. Eight men residing in Colorado, West Virginia, Pennsylvania, Alabama, Montana, Utah, and Texas also were awarded Medals of Honor by the association for individual deeds of heroism in saving life in mines and plants of the minerals industry during the past year.

EE Wins Editorial Award



It was recently announced that *Excavating Engineer* won an award of merit in the *Industrial Marketing* 14th Annual Editorial Achievement Competition. It marks the third consecutive year *Excavating Engineer* has received this recognition. The award for "an outstanding single article published during the period ending Dec. 31, 1951" was given for an article which appeared in the August issue. The winning entry—"From Park to Parking Garage"—dealt with the construction of an underground garage in Los Angeles' Pershing Square. It was written by a regular contributor, Robert J. Green.

Announcement of the award was made in Chicago on the 2nd day of July at the annual conference of the National Industrial Advertiser's Association. NIAA members helped judge the Editorial Achievement competition.

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Continued on page 42

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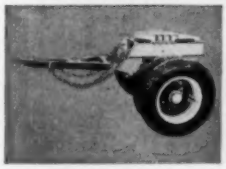

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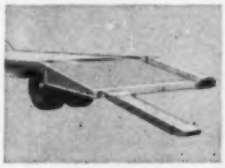

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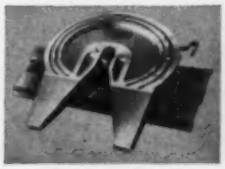

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POWER THAT PAYS

Atlanta airport expansion job is scene of new triumph for International power

When C. A. A. district headquarters decided to move to Atlanta, Georgia, the east-west runway at nearby Fulton County Airport had to be extended to 5,000-foot length.

One contractor, C. L. Rhodes of Decatur, Georgia, is doing the entire job, including cutting through a 39-foot hill and moving 350,000 cubic yards of sandy clay.

Rhodes' General Superintendent, R. N. Smith, tells how the work is going:

"We load quicker, haul faster and move more dirt with our Internationals than with any other crawlers.

"Our operators push 'em to the limit all day long to get the job done ahead of schedule. The tractors get clean filters, fuel and grease, and hard work—more hard work than is reasonable—and they take it month after month without a let down!"

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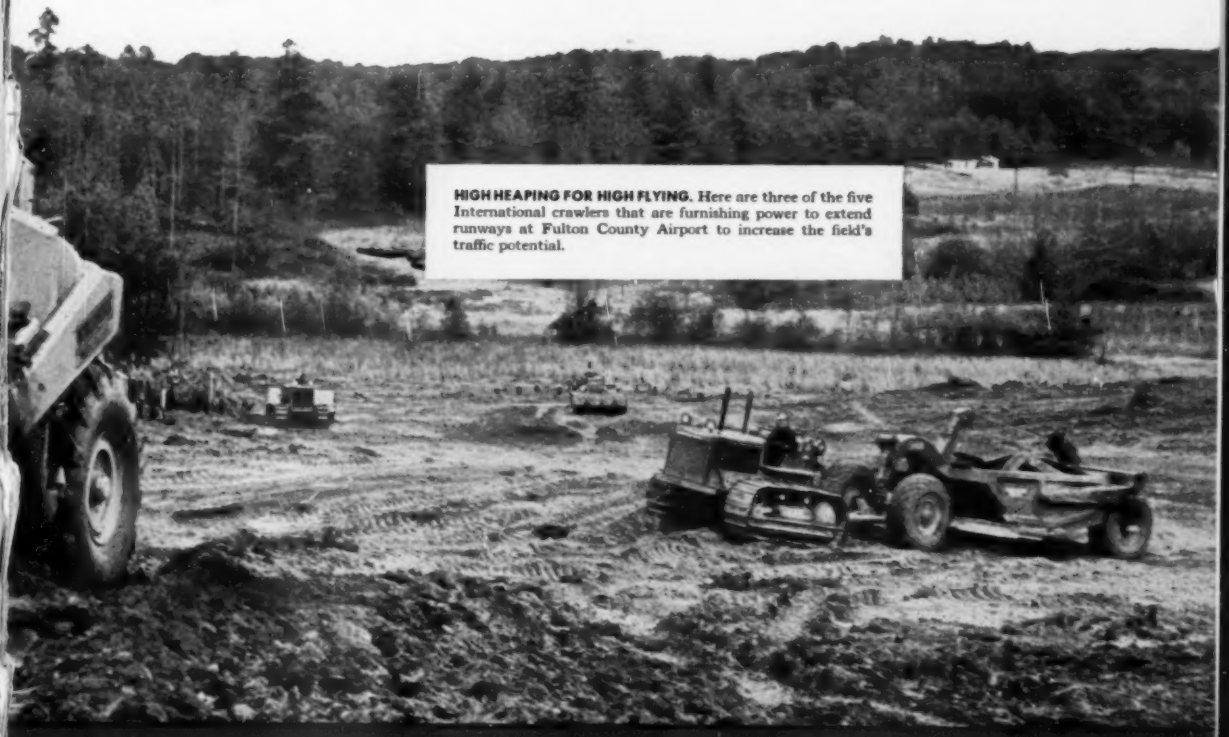

HIGH HEAPING FOR HIGH FLYING. Here are three of the five International crawlers that are furnishing power to extend runways at Fulton County Airport to increase the field's traffic potential.

Continued from page 39

largest in Texas, has established a branch office, warehouse, and shop in Greggton, Tex. It will serve a 21 county east Texas area.

The property consists of 7.5 acres and the buildings contain 50,000 square feet of floor space. The Greggton branch will have more floor space than any of the company's other branches at Dallas, Houston, and Lubbock. It also has a spur track for 15 freight cars.

The Longview-Greggton area was selected as the company's east Texas district headquarters because of its central location, its excellent railroad and highway facilities and because the firm's executives believe it to be the center of the growing industrial activity in east Texas. The new branch will initially employ about 35 people.

The opening ceremonies which were held the 24th of May attracted about 2,500 people.

Pan-American Engineers to Meet in New Orleans

Engineers Joint Council announced its formal acceptance of an invitation to send representatives to the Third UPADI Congress in New Orleans, La., Aug. 25-30, 1952. The delegation will be made up of representatives of each of the constituent societies.

UPADI in its English title is the Pan-American Union of Engineering Societies. Its purpose is to provide an organization which will encompass the engineering societies of both North and South America and promote their activities on an international scale. The New Orleans meeting is the third in a series which began in 1949 in Rio de Janeiro and continued in Havana in 1951. It is anticipated that UPADI will complete its organizational work at the meeting in August.

Representatives of engineering societies of nineteen Western Hemisphere countries including the United States and Canada will come to New Orleans for the meeting. The congress will be under the leadership of Engineer Luis Giannattasio of Montevideo, Uruguay. Giannattasio is president of UPADI. James M. Todd, former president of EJC and ASME and chairman of the EJC-UPADI Committee, is in charge of arrangements in New Orleans.

In addition to the official delegates, a number of engineers and industrial executives from Latin America, the United States, and Canada are expected to attend. When the congress adjourns, several of the delegates and observers plan to go to Chicago to participate in the Centennial of Engineering.

The facilities of Tulane University have been secured for the meeting. The university will also provide housing and dining rooms.

• Two London, England concrete manufacturers deliberately destroy pre-stressed concrete footbridge left over from Festival of Britain by lowering pig iron ingots onto it. When weight reached 85 long tons, the 76 ft. span of 284 ft. bridge collapsed.

Over a Million a Day Lost by Big City Traffic Tangle

Between one and two million dollars a day—that's what traffic congestion is costing a city like Chicago, Ben F. Ostergren, manager of the county and local roads division of the American Road Builders' Association, told the County Engineers Association of Ohio in Columbus. Delays in time, acci-

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dents, lowered morale of workers and disruption of mercantile and industrial schedules accounts for this huge toll, he asserted.

Emphasizing the danger of shortages of steel for highway purposes, Ostergren pointed out that Chicago, in its effort to escape from its traffic bottleneck, requested 3,000 tons of steel for an extension of Lake Shore Drive. It was given 250 tons.

"That tells the whole story of the present steel situation. We ask for a certain amount of steel and get one-twelfth of what we need," the ARBA official told the county engineers. In the overall picture, highways are being allotted 27.9% of the carefully-screened demand for structural steel in the first quarter of 1952. He quoted the Bureau of Public Roads as reporting 656 important road projects as being delayed for lack of steel.

The speaker conceded that steel was sorely needed in the defense effort, but went on to show that highways were an essential and vital part of that effort.

Recommend Toll System for New England Thruway

A toll system of financing the proposed $108.5 million New England Thruway between the Connecticut cities of Greenwich and New Haven was recommended by the Chicago engineering firm of H. W. Lochner & Co. in a report to Governor Lodge.

In proposing a toll system, with toll stations so placed that local traffic could move free of charge, the engineers rejected two other financing methods—an increase in the state gasoline tax from 4 to 5c a gallon and a levy on commercial vehicles that would use the highway.

A gasoline tax rate increase was rejected, because, under such a system, residents of Connecticut would be required to assume the entire cost of a highway that would also be used by residents of other states. The commercial vehicle tax plan was rejected on the ground that it would require abandonment of a reciprocity system with other states.

A shore-line route for the proposed highway was recommended by the engineers.

The recommended route has a total length of 43.7 miles. While the cost of the new highway has been estimated at $111.7 million it was noted that $3.2 million of this amount already has been appropriated for a by-pass in Darien, leaving $108.5 million as the future expenditure required. Of this amount, $37.5 million is for the right-of-way and $71 million for construction.

Turkish Dam Contract Goes to American Firm

The Eti Bank of the Turkish government has awarded an $11 million contract to Thompson-Starrett Co., Inc. to head a group of Turkish-German associates to construct a huge dam on the Sakarya River, it was revealed by J. R. Van Raalte, president of the New York building firm. This is the first major part of the scheduled $35 million Sariyar hydroelectric project designed by American engineers to help accelerate the industrialization of northwestern Turkey.

ECA funds are being utilized by the Eti Bank to build the new hydroelectric project. When it is completed, in 1954, its electric power will place Turkey in a much stronger position in the Western defense organization. Turkey will then be able to expand her steel and manufacturing industries permitting her to produce more of her own armaments and relieve pressure on the United States for such help Van Raalte said.

For the Sariyar Dam, Turkey will provide about $10 million in steel and other essential materials.

Thompson-Starrett will purchase and ship American specialized equipment needed to build the dam in a rugged and presently undeveloped part of the country, about 75 air-miles west of Ankara. In all, Thompson-Starrett will ship about $1 million worth of equipment including: cableways, crushing and screening plant, sand-making plant, concrete mixing plant, and concrete cooling plant. There will also be Diesel-electric engines that will furnish the 6,000 kilo-volts required for power used during construction of the dam.

Charles T. Main, noted engineer of Boston, designed the Sariyar hydroelectric project for the Turkish government and selected Thompson-Starrett to furnish the administrative and consulting engineers to direct construction. The balance of the supervisory forces will be provided by Turkish and German associates: RAR Turk Limited, Sosyetesi, Istanbul, Turkey; Philip Holzmann, A. G., Frankfurt, Germany; Hochtief A. G., Essen, Germany; and Siemens Bauunion G.mb.-H. Munich, Germany.

While the Sariyar Dam will be smaller than Grand Coulee, it will be the largest in Turkey with a height of about 350 feet. At its crest it will be about 1,000 feet long and at its base 275 feet thick. A reservoir with a capacity of about 7 million acre feet of water will be formed. The dam will require about 700,000 yards of concrete.

Continued on page 46

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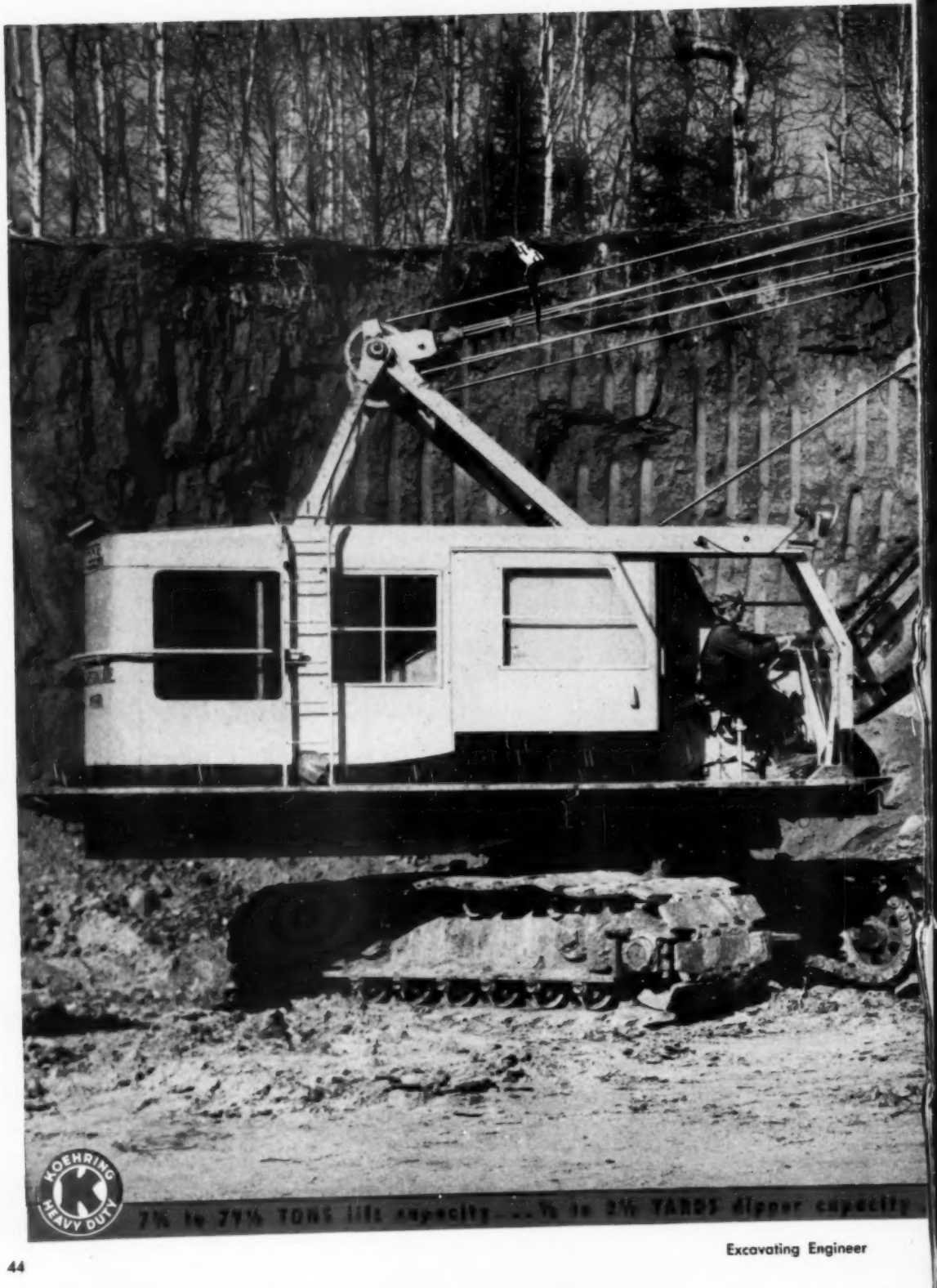
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Continued from page 43

It is planned initially to utilize two turbines in the powerhouse that will generate about 60,000 kilo-volts of electricity. Later, with the addition of two more turbines and a grid system, about 350,000 kilo-volts of power will be furnished.

Work on the dam started the 1st of March. Shipment of equipment took place between the 1st of May and the 15th of June. About 15 kilometers of roadways have been started to transport equipment and supplies. In addition, a 30 foot wide tunnel has been started to divert the water from the Sakarya River while the dam is being built. This penstock tunnel will later be used to furnish water from the dam to the turbines generating electricity.

The Sariyar project is expected to stimulate foreign-financed enterprises in Turkey. Van Raalte pointed out that a recently passed Turkish law opens its door wide to foreign private capital. According to the Turkish Information Service in New York, the new law provides special privileges for foreign capital contributing to the economic development of Turkey. Foreign investors are guaranteed in advance the right to take out of Turkey, in the original currency of investment, annual profits, dividends, and interest, and also the original invested capital.

Dozer Crushes Cars for Scrap Dealer

With defense again taxing the capacities of the steel industry, a western scrap dealer has come up with a novel and successful method to speed scrap to the nation's open hearths.

To crush automobiles and then push them up to a crane which feeds the scrap baler, the Compressed Steel Co. of Denver has equipped an Allis-Chalmers tractor with a Gar Wood hydraulic dozer blade. This combination of earth moving equipment crushed 75 car bodies a day and enables the crane to feed the baler at a rate of 150 tons each 18-hr. working day.

The sturdy blade and powerful tractor make it unnecessary to follow the usual procedure of removing the frames from the bodies. Placing a scrapped automobile against a concrete bunker, the dozer blade crushes the body and frame in one motion. Then serving double duty, the dozer keeps the scrap pushed up to the crane.

It is believed that this blade and tractor is the first application of construction equipment in crushing automobiles with frames still attached.

• A Denver scrap dealer is using this Allis-Chalmers tractor equipped with Gar Wood blade to crush automobiles. Before this machine was used, it was necessary to remove frames prior to crushing.

Cornell Honors Engineer

E. P. Swatek, chief design engineer of the contracting division, Dravo Corp. has been awarded the Fuertes Graduate Medal by Cornell University's school of civil engineering. An alumnus of the class of 1940, he holds the degree of Bachelor of Science in civil engineering.

The award was presented to Swatek in recognition of a paper he authored on the reconstruction of Lock 2 in the Monongahela River at Braddock, Pa.

Established in 1893, the Fuertes award is given annually to a Cornell graduate who has written the most meritorious paper on some engineering subject tending to advance the scientific and practical interests of the civil engineering profession.

Empire Mineral Congress Set for Australia in 1953

The Fifth Empire Mining and Metallurgical Congress will be held in Australia from the 12th of April to May 23, 1953. The last congress met in Great Britain in 1949.

The chief object of the congress is to afford an opportunity for mining engineers, metallurgists, scientists, engineers, and others of the industry to meet and discuss technical progress and problems, including the development of the mineral resources of the British Commonwealth. A variety of tours have been arranged.

At the present time it is planned to hold two principal technical sessions with the first to be held in Melbourne and the second in Sydney. In addition, sessions may be held at several of the mining centers during the visits of the congress members.

Present headquarters for the Australian meeting is at Osborne House, 399 Little Collins St., Melbourne. Interested parties are urged to write now.

Conveyor Empties Coal Car in One Minute

A new conveyor belt capable of unloading a full car load of coal in one minute has been installed by the Rail-To-Water Transfer Corp., Chicago, making it one of the fastest coal unloading installations in the world.

The belt is 72 inches wide and 942 feet long. It is designed to handle 3,000 tons of coal per hour, an increase of 50% over the 54 in. belt formerly used. The increased capacity will result in a financial saving and will speed up service for customers.

The belt, a U. S. Giant, is made of 7 plies of 42 ounce duck with a ¼ in. rubber cover on top and a 1/16 in. cover on the pulley side. It is the longest 72 in. conveyor belt in operation in the world. It is driven by a 350 hp motor and has an operating speed of 560 fpm. The new belt is fed by a five car unloading facility compared with a two car facility for the old belt. It was shipped by rail in two sections from the United States Rubber Co. plant in Passaic, N. J.

The loading plant is located on the Calumet River at 101st St. Coal originating in Kentucky and southern Illi-

Continued on page 50

This modern machine is next to infallible—yet even so, the Bethlehem operator checks the reduction of his wire.

His attention to detail means better rope for you

Wire-drawing is a fundamental step in the making of Bethlehem rope, and it's done on machines that almost never make mistakes. Nevertheless, this operator, like others in the Bethlehem mill, runs frequent checks on the work going through. He wants to be sure that his part of the job meets the specified standards—which are very, very high.

This care, this attention to detail, is not confined merely to the drawing of wire. It begins with the making of the steel used in Bethlehem wire rope, and it carries through each and every step to the final inspection and reeling.

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You can have a gold mine instead of a headache when you put your scrapers to work behind the new M-R-S 190. You can have all the big advantages of a versatile rubber-tired prime mover without losing the large investment you already have in scrapers. *And*—with this same prime mover, in a matter of minutes, you have power for bottom-dump Mississippi Wagons, for on- and off-highway hauling, for heavy compacting rollers, for blade graders or for general utility.

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SELF-LOADS UP TO 12-YARD STRUCK SCRAPERS WITH EXCLUSIVE M-R-S WEIGHT TRANSFER

The M-R-S exclusive WEIGHT TRANSFER provides additional drive axle weight which increases the normal ground contact area of the soft, low-pressure drive tires by approximately 60%. The result . . . high tractive coefficients and drawbar pull which permit the M-R-S 190 with standard-drive tires to SELF-LOAD a 12-yard struck, 15-yard heaped scraper, and serve as a prime mover for four-wheel scrapers up to 20-yard struck capacity pusher loaded. This high production plus lower equipment first cost is the answer to contractors' needs for high-speed rubber WITHOUT THE SINGLE-PURPOSE CHARACTERISTICS of specialized units.

An M-R-S 190 self loads a 12 yard struck scraper with proper use of the exclusive M-R-S WEIGHT TRANSFER.

SWITCHES QUICKLY TO BOTTOM-DUMP MISSISSIPPI WAGON

The M-R-S 125, 150 or 190 which provide power for scrapers can be quickly switched to the bottom-dump Mississippi Wagon. The four-axle construction of the Mississippi Wagon permits high payloads without exceeding the 18,000-pound axle loads of most state laws. This high production bottom-dump wagon combination can legally haul large payloads over most state highways and has the ruggedness necessary for off-highway hauling.

The M-R-S 125 and Mississippi Wagon hauls excavation from a borrow pit to the highway, and then down the highly traveled highway to a bridge abutment.

TURNS IN SHORT RADIUS OF ONLY 28 TO 34 FEET

The short turning radius and high maneuverability of M-R-S Tractors when powering four-wheel cable scrapers is ideal for contractors engaged in the construction of narrow secondary roads. This versatile prime mover with rubber-tired speed and economy is interchangeable with the scrapers used behind your crawler tractors. It keeps your own equipment working all the time and eliminates the need for costly single-purpose equipment.

M-R-S provides a short turning radius and high maneuverability when used to power four-wheel scrapers or M-R-S bottom dump wagons which makes it ideal in construction of narrow secondary roads.

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Continued from page 46

nois is dumped into hoppers through a vibrating feeder, then it passes up the main belt to two short belts which feed a universal chute emptying into river boats.

Indian River Development to Get Burec Help

Clemeunt T. Douglass, Jr., and Fred H. Hartz, Bureau of Reclamation engineers, are in New Delhi, India, where they have joined the Point Four reclamation mission now cooperating on dam and powerplant design and construction problems in developing major river basins.

The two engineers will serve as advisers to India's Central and Water Power Board in the water resources development program. This program is aimed at increasing food production, providing additional hydroelectric power, preventing soil erosion, and controlling floods during the monsoon season.

Douglass, who has been engaged in concrete and earth dams research at the reclamation bureau's engineering center, Denver, Colo., will advise the board in matters related to concrete construction and the installation of a batching and mixing plant.

Hartz, a mechanical engineer attached to the bureau's Sacramento, Calif., regional office, will supervise technical work in the design and preparation of specifications for mechanical features of dams and powerhouses, including gates, cranes, penstocks, valves, and pipes.

Three other Reclamation engineers, Clarence Rawhouser and Paul von der Lippe of Denver, Colo., and Clifford L. Mutch of Arapahoe, Neb., have been

• In this composite drawing we see all of the work of the Turner Construction Co., NYC, which was substantially completed during 1951. Work less than 50% complete was not included in "Turner City" for 1951.

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J. S. Whyte

Jessel S. Whyte, 61, president and general manager of the Macwhyte Co., died on the 28th of May after a prolonged illness. The head of the Kenosha, Wis. wire rope producers was active in many civic and philanthropic activities.

He was born Nov. 25, 1890, at Chicago, son of George S. and Anna J. Whyte. He was educated at University high school, Chicago, Cornell University, Ithaca, N. Y., and took his post-graduate studies in metallurgy at Sheffield University, Sheffield, England.

During World War I he served with the army engineers in France.

His marriage to the former Ruth Johnson of Chicago, took place Oct. 9, 1915, at Chicago.

Mr. Whyte started his career with Macwhyte Co., in 1905 in the winding department when the plant was located in Coal City, Ill. Later he studied in England and served his apprenticeship in Scotland and returned to Macwhyte Co. as a foreman in the wire mill in 1914. The company was moved to Kenosha in 1912 and Mr. Whyte soon became wire mill superintendent.

In 1916 he was elected a director. He was general superintendent and a director of the company in 1917 when he left for army service. Mr. Whyte resumed his duties again in 1919.

In 1921 he went to Pittsburgh to be in charge of sales for the entire eastern territory and in 1922 was called to help at the post of assistant general manager. He was appointed vice president in 1927 and in 1929 became vice president and general manager. After serving in this capacity for 10 years, he was made president and general manager of the firm in 1937.

Mr. Whyte was a member of the board of the Macwhyte Co., the First National bank of Kenosha, the American Hoist and Derrick Co., St. Paul, Minn., the American Red Cross, the Kenosha hospital and the Kenosha Youth Foundation. He took an active part in the Community Fund organization for many years.

Survivors besides his widow include four daughters, his mother, Mrs. Anna Whyte, Kenosha, and six grandchildren.

in India for several weeks cooperating in this project. An electrical engineer, not as yet named, will go to New Delhi later, completing the mission of six advisers.

The project is being financed during the current fiscal year by a joint Indo-American technical cooperation fund, set up under a joint agreement between the two countries.

Nebraska Road Plans Washed Out by Floods

Nebraska State Engineer Harold Aitken said recently that floods and weather have sabotaged the state's 1952 highway construction program.

He pointed out that the Missouri River rampage affected the program in two ways: Damage to highways will require additional maintenance spending, leaving less for construction, and the flood's disruption of traffic will probably reduce gasoline tax revenue.

Heavy Traffic Spurs Plans for Jersey Pike Widening

With the new 118-mile New Jersey Turnpike facing a traffic volume it hadn't expected until 1957, the State Turnpike Authority is considering plans for widening the present toll superhighway and speeding to completion connecting links with other arteries.

Following an all-day conference with engineers, authority chairman Paul L. Troast announced that emphasis in the authority's plans would be in this order: (1) Completion of restaurants, gasoline filling stations, and rest rooms for the convenience of toll payers. (2) Expenditure of $234,000 to open up new traffic lanes at toll interchanges. (3) Expenditure of $152,000 to widen interchange approaches at Raymond Blvd., Newark, and at Elizabeth and

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Woodbridge to speed vehicles on and off the highway. (4) Expansion of state police forces on weekends to keep traffic moving and clear the road when accidents occur. (5) Employment of 27 additional toll collectors to speed vehicles through the toll lanes and avoid jams.

These steps would be followed by major construction work to build connecting links with other traffic facilities and possibly widen the main stem of the turnpike, which is made up of six and four lanes.

Representatives of the Turnpike authority, State Highway Department and Jersey City and Bayonne officials have reached agreement on the proposed direct link between the turnpike and the Holland Tunnel. The project would cost an estimated $80 million.

Troast announced that studies were progressing as well on proposals to extend Route 10 from Livingston through Newark to Kearny and the turnpike by a new bridge across the Passaic. They also contemplate building connecting links between the New Jersey toll road, the New York Thruway, and the Pennsylvania Turnpike. All of these projects will hinge on reports from traffic and revenue engineers who must determine whether they would be self-supporting as toll projects.

On the basis of recent traffic the New Jersey Turnpike should yield $11,861,000 in its first year of operation. Traffic and revenue engineers have estimated the turnpike would collect $8,050,000, in its first year.

Troast pointed out that if travel continues to increase, the first year might produce revenues of $15 million, a level that had not been expected until 1960.

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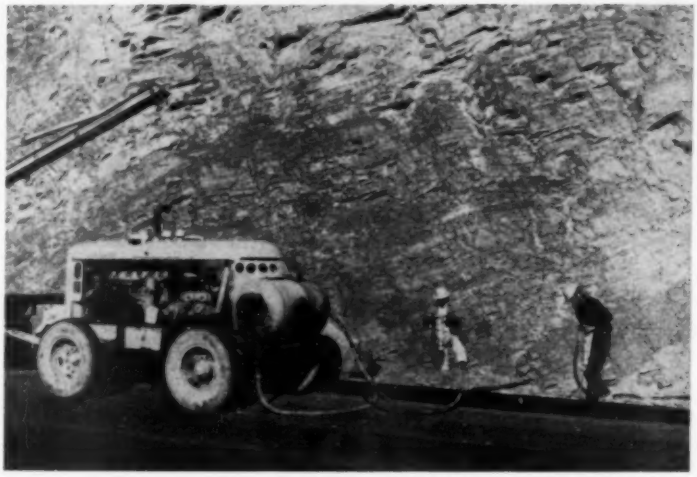

• A. Teichert & Son, Inc., Sacramento, Calif., contractors installed a used 150 hp Model HBI-600 Cummins Diesel in this portable Ingersoll-Rand compressor in 1949. Although operated in a motor scraper from 1941-49 this engine continues to give dependable service. Capacity of the compressor is approximately 210 cfm.

New Hotels to Rise in Texas and Connecticut

Approval to proceed with construction of hotels in Hartford, Conn., and Dallas, Tex., was received by Hotels Statler Co., Inc., from the National Production Authority.

"Release of materials and supplies for the 700-room Dallas Statler," said Arthur F. Douglas, president of Hotels Statler Co., Inc., "is to start in the fourth quarter of 1952."

Plans and specifications for the 450-room Hartford Statler, which have just been completed, will be released to all interested contractors immediately.

It is expected that architects' plans for the Dallas Statler will be completed within the next few months.

Plans for the Hartford Statler, which will occupy a site of 45,000 sq. ft. facing Bushnell Park, were completed early this year by architect William B. Tabler of New York.

This 16-story building, of concrete and steel, with alternate reinforced concrete construction, will be completely air-conditioned. The Hartford Statler will be largely financed by Aetna Life Insurance Co. and the Travelers Insurance Co. of Hartford.

Cleveland Airport Hangar Backed by Private Capital

Construction of a new $3.5 million hangar at Hopkins Airport, Cleveland, with private capital and without burden to the taxpayers, has been undertaken by Thompson-Starrett Co., Inc., a New York building firm.

Under this plan, Thompson-Starrett will rent from the city of Cleveland the land required for the hangar and related facilities, will co-ordinate the design, financing, and construction of the hangar facilities, and will then lease them back to Cleveland on a 25-year lease with title to revert to the city at the end of that period.

To assure architectural harmony between the new hangar facilities and Cleveland's new multi-million dollar Airport Terminal Building, the latter's architects, Outcalt, Guenther & Associates, will also be retained by Thompson-Starrett as architectural consultants on the hangar project.

Cleveland's new hangar facilities have been designed to accommodate the largest transport aircraft in use or in reasonable prospect.

The airline sections of the new hangar will have a total length of 750 feet, a depth of 150 feet, a clear height of up to 40 feet, and clear spans of up to 250 feet. Sections of the new hangar designed for corporate, executive, and other private aircraft will have a total length of up to 625 feet, a depth of 125 feet, a clear height of 30 feet, and clear spans of about 125 feet.

Repair shop and storage space will be provided at the rear of the hangar in a ground floor lean-to, 30 feet wide, which will run the entire length, 1,375 feet, of the building.

Those who were largely responsible for working out the plan to provide these essential hangar facilities without cost to the taxpayers of the city of Cleveland included Law Director Joseph H. Crowley, Airport Commissioner Jack Berry, and Deputy Air Commissioner Claude King. James C. Buckley, Inc., terminal and transporta-

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Find out more about the dirt-hauling member of the BIG RED TEAM **— see your** *International Industrial Tractor Distributor* **for full details on Bucyrus-Erie B-Type Scrapers.**

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tion consultants of New York, worked with the city of Cleveland and with Thompson-Starrett in completing the arrangements.

Build Big Stone Revetment on Pacific Coast

Construction of a huge, stone revetment designed to prevent further erosion of 3,000 feet of shoreline south from the Northwestern Pacific tracks to Buhne Point, Calif. has been underway for several weeks.

The barrier, requiring approximately 70,000 tons of rock, and costing more than $300,000, will "armorplate" the sea-washed shoreline with a thick coating of heavy rock, rising 16 feet above sea level at some points.

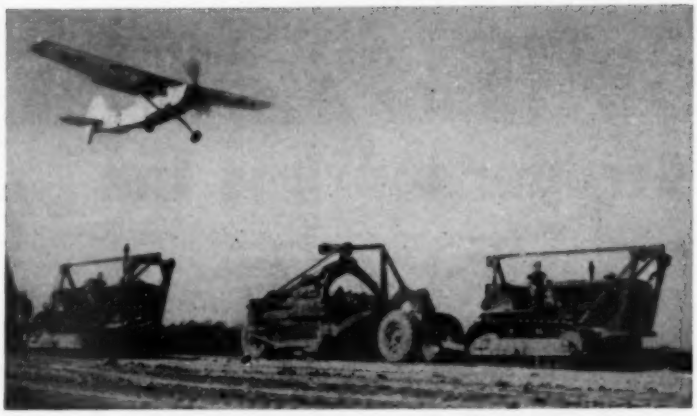
The Pacific Gas and Electric Co. awarded the building contract to Mercer, Fraser Co., Inc., of Eureka. Completion date is the 1st of October.

Ten weeks ago PG&E announced purchase of a 137 acre site at Buhne Point for a proposed steam-electric generating plant, with a planned original capacity of 40,000 kilowatts in one unit and provision for expansion to meet future demand. The date of plant construction has not yet been set.

PG&E engineers said that since 1902 the shoreline opposite the mouth of Humboldt Bay has retreated 1,000 feet because of erosion by buffeting seas. Most of this — 800 feet — has been washed away in the last 20 years.

Rocks as large as six tons will form the revetment's sloping seaward face, with the supporting base structure being built of smaller stones up to 1,000 lbs. each.

The rock being used is exceptionally heavy, weighing 5,200 lbs. per cubic yard of solid rock.



• Engineer soldiers are given practical courses in air field construction at Fort Belvoir, Va. The Corps of Engineers directs a development program to provide efficient, speedy construction for U. S. Army and Air Force. Below: An instructor gives go ahead signal to another class at Fort Belvoir. *U. S. Army Photographs*

Courts Rule on Contract With Dual Specifications

A prominent pile driving company came within a hair of losing $70,000 on a $512,000 contract last summer. The contract called for driving 4,325 steel encased cast-in-place concrete piles to a load capacity of 20 tons each for one of the buildings at the new Boston, Mass., airport. The usual tests were made before work began and the safe value of piles was to be determined by the standard formula:

$$P = \frac{2WH}{S+0.1}$$

P being twenty tons; W, being the weight of the hammer, 5,000 lbs.; H, the fall of the hammer, three feet; and S, the average penetration per blow under the last five blows, was 0.65 inches.

The contractor had driven 4,324 of the 4,354 piles in accord with the formula when Massachusetts state engineers began to make load tests. Several of the piles subsided more than a quarter of an inch under their rated load and had a load capacity of only fifteen tons. The State ordered more piles driven but refused to pay for them, claiming the contractor had not performed in accordance with the terms of the contract. The contractor drove the piles to get the job done, but claimed he was entitled to pay for this extra work.

The trouble was that the contract provided two specifications for the same job. The piles were to have a load capacity of twenty tons or not penetrate over 3.25 inches under the last five blows. None of them did penetrate

over 3.25 inches under the last five blows but many would not support a twenty-ton load.

The contractor sued the state of Massachusetts, and after losing once finally obtained his money by a verdict of the supreme court of Massachusetts. The lawsuit was long, expensive and could have been avoided if the contract had been more carefully worded.

In complex building contracts it is easy for contradictions or inconsistencies to slip into the specifications. Then if the contractor complies with either one of them he feels that he has performed the contract, while the owner may be thinking of the other. A few extra hours spent checking over a contract may pay huge dividends in prompt undisputed payment.

Retirement After 47 Years For F. H. Hopkins Official

J. Harold Alexander, vice president of F. H. Hopkins and Co. Ltd., Montreal, Que., retired on pension Nov. 30, 1951, after more than 47 years of service with the firm.

Alexander was born in Montreal Nov. 26, 1886. As a boy he frequently passed a showroom in Montreal which attracted his attention. There he saw air compressors, rock drills, hand and power pumps, wheelbarrows, scrapers, etc. At that time he often wished he could enter that sort of work.

Upon graduation from high school, Alexander joined a survey party, working on the northern section of the Toronto-Sudbury railway line. However, he soon tired of this work and answered an ad of F. H. Hopkins & Co. Alexander started with the firm in October, 1904, at the rate of $20 a month as an orders, shipping, and invoice clerk.

Alexander has been with Hopkins for all but six months of its existence. Before April, 1904, the firm was known as the James Cooper Co. It was Cooper's window which interested Alexander as a boy.

American Export Man Sees World Highway Gain

Added impetus to the building of new roads in foreign lands last year clearly indicates that worldwide interest in the development of better highways is gaining momentum.

This observation is advanced by Frank T. Magennis of The Goodyear Tire & Rubber Export Co. who has been reelected chairman of the board of the International Road Federation (IRF).

Magennis, a vice president of Goodyear Export Co. since 1944, was recently renamed to the IRF post which he held last year at the first world meeting of the group in Washington, D. C.

Twenty-six of the 38 countries affiliated with IRF were represented at the two-day meeting, presided over by Magennis.

"Typical of the road building being undertaken in foreign countries is the Mexican rural roads plan to develop its feeder road system. Under the plan, Mexico in the past two years has built approximately 3,000 miles of new thoroughfares—a distance comparable to the span between New York City and San Francisco," Magennis said.

Founded in 1948 by businessmen in the belief that good roads are necessary for social and economic development, IRF is a service organization to encourage the development and improvement of highways.

Discussing the function of IRF, Magennis pointed out that the group assists national road associations in promoting a road consciousness among the public and governments, and fosters the organization of new national road groups.

In conjunction with this service,

The above picture illustrates one of the many ways of applying a Sauerman Drag Scraper in the open storage of bulk materials. Here the scraper stores crushed rock in a high pile covering a large area and then reclaims (as shown in picture) to a hopper at processing plant. The operation costs only a few cents per ton handled.

with the

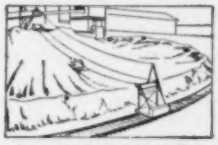
SAUERMAN METHOD

By using a Sauerman machine you can be sure of doing almost any long range material handling job more efficiently and at less cost. That's because it digs, hauls and dumps in one continuous cycle—under the positive control of one operator.

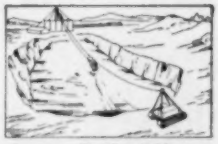
Sauerman excavators are classified under two main groups—power drag scrapers and slackline cableways. Either type of machine will span a large area and move material rapidly from point to point anywhere within that area.

The Sauerman power drag scraper is widely used for general excavating and stockpiling. The slackline cableway is ideal where it's necessary to dig deep, especially under water, and lift to a high delivery point. Both machines are simply designed, easy to operate, low in maintenance as well as power costs.

Sauerman Scraper Excavator



Sauerman Scraper Stockpiler



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STEEL CONSTRUCTION COMPANY
427 GEIST RD., ERIE, PA

● Seen from this viewpoint, this section of beltroad looks like a roller coaster as it threads itself around mountain. Steel towers supporting the conveyor system are as high as 30 feet at some points and are anchored in solid rock. Excavation to level belt route was not attempted because of constant threat of landslides.

Magennis explained that the IRF collects and distributes technical, economic, statistical and other educational materials relative to the benefits derived from good roads and supports advance training in highway engineering.

IRF also acts as consultant to the United Nations and last year was granted membership in the Highway Research Board, National Academy of Sciences of the United States. The federation maintains headquarters in London and Paris in addition to the Washington D. C. offices.

Conveyor Belt System Extends Over 2.5 Miles

A rubber conveyor belt system that looks like a Coney Island roller coaster but stretches more than two and a half miles over, around and under rugged mountains is helping to make mountain-ringed Kanawha River Valley, near Charleston, W. Va., one of the nation's fastest-growing strategic industrial areas.

The conveyor, featuring a B. F. Goodrich rubber beltroad, transports coal from a mining area which is one of the sources of coal for a large steam generating plant now under construction on the banks of the Kanawha at Glasgow, W. Va. Based on estimated coal deposits tapped by the belt, it is believed that the conveyor system will still be playing a vital role in the economy of this booming industrial valley 100 years from now.

The first flight of rubber belt, a 1,200 ft. section, picks up coal from a drift mine 500 feet up on the side of a 1,900 foot mountain and carries it down the mountainside at a 17° angle for an overall drop of 296 feet.

From here, the belt threads its way across country for more than 4,000 feet, then rises to cling to the steep side of a second mountain which it circles for 4,700 feet in a series of roller coaster dips and rises. The rubber beltroad next burrows into a 4,000 ft. tunnel drilled through the base of a third mountain. The belt emerges finally at the Kanawha River, near Montgomery, W. Va., 14,000 feet from the start of its skyscraper ride. The beltroad discharges its coal cargo into river barges.

Enroute to the river, the conveyor makes two abrupt 90° changes in direction, crosses over one road, tunnels under another. The entire system is composed of nine flights, or sections, of rubber conveyor belting, ranging in length from 230 feet to 3,770 feet, pulley to pulley distance.

Additional power brought to the Kanawha River Valley by the beltroad will make the area, more than ever before, the Ruhr of the nation's chemical industry. During the past 20 years, more than a billion dollars have been invested in industrial and commercial development in a 60-mile stretch along the banks of the Kanawha. Electrochemical and electro-metallurgical plants which require vast amounts of electrical power have sought out the valley to be near a plentiful source of power. Coal is the key to this power.

The spectacular downslope belt of the conveyor system, six months in operation, has moved 125,000 tons of coal from mine to stockpile while awaiting completion of the main line conveyor legs to the river. The downslope belt is 42 inches wide, cord-rein-

an ACCO product

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Hazard LAY-SET Preformed
—the Green Strand brand

• The **green** strand in a HAZARD wire rope identifies it immediately as LAY-SET Preformed improved plow steel. The **green** strand is your guarantee that the best materials are used to produce a safer, longer-lasting rope.

Hazard's experience making quality wire ropes goes back to 1846. Hazard's modern research and engineering is constantly at work improving wire processing and manufacturing techniques so that the wire ropes that bear the proud HAZARD brand will continue to be the most economical ropes for you to use.

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AMERICAN CHAIN & CABLE

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makers of ACCO Registered WIRE ROPE SLINGS

• The U. S. Air Force will use this 15-ton capacity heavy duty truck now in production. Sterling Division of The White Motor Co. is the manufacturer.

forced, and can handle 350 tons an hour. Eight remaining belts in the system are 36 inches wide, can handle 550 tons an hour.

Big Alaska Work Season After Heavy Winter Bidding

The full scale launching of the 1952 Alaska defense construction outdoor work season is underway now with the announcement by the Corps of Engineers of results of two bid openings, a construction award, and of the readiness of thirty-five active contracts totaling $85 million.

The spirited winter bidding market for Alaskan Command construction has resulted in lower cost for the government and there have thus emerged a large number of newly contracted projects of all types. In addition, many awards for construction services have been made. These combined with unfinished jobs carried over from other seasons, provide a formidable program for the current eight months' construction period now beginning.

Invitations to all contractors to bid on more new projects now in planning will continue to be issued.

Washington State Reveals Columbia River Dam Plans

Plans for construction of the long-projected Priest Rapids dam on the Columbia River, at an estimated cost of $250 million were announced by Grant County Public Utility District commissioners at a meeting in Moses Lake, Wash.

The commissioners authorized filing of condemnation proceedings to acquire title to the land at the proposed dam site, 20 miles below Vantage bridge.

The dam would be the third largest power producer in the Pacific northwest, exceeded only by Grand Coulee and Chief Joseph dams.

Building of a major Columbia River dam by a PUD would be a precedent-setting move in the history of the region's power development. All other major Columbia projects were built by the federal government, although the Chelan County PUD has an agreement for enlarging the privately-owned Rock Island dam upstream.

Many hurdles in financing and contracts will have to be cleared before the huge project could actually be started.

PUD Manager Glen A. Trothers said the financing plan calls for sale of revenue bonds which would be a lien solely against the generating system.

Trothers said financing has been discussed with the PUD's bonding firm and "they tell us it can be financed if contracts to sell power are

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• This Northwest clamshell is unloading the sand dredge *K. E. Doville* in Chicago. The clamshell is powered by Caterpillar Diesel D8800 engine.

obtained." He said the PUD expects little difficulty in selling excess power in view of the northwest's electricity shortage.

Massachusetts Turnpike Announces Appointments

Governor Dever appointed State Public Works Commissioner William F. Callahan to serve as chairman of the newly-created Massachusetts Turnpike Authority.

Benjamin H. Grout, an associate state commissioner of public works, and John R. Kewer, chairman of the Boston Port Authority, were named the other two members of the new toll road authority.

Created by the 1952 state legislature, the turnpike authority is empowered to issue revenue bonds to finance the construction of a cross-state toll highway expected to cost between $150 million and $200 million.

Crushing-Screening Plant Built for Armed Forces

A new crushing and screening plant has been designed and built for the U. S. armed services by Pioneer Engineering Works, Minneapolis, Minn. The new plant is known as the Model 33R triplex crushing and screening plant, and is designed for crushing and screening gravel and rock for use on air fields and military roads.

• This new crushing and screening plant has been designed and built for the U. S. armed services by Pioneer Engineering Works, Minneapolis, Minn.

When the specifications for the 33R triplex crushing and screening plant were set up by the government, designers had to devise a machine which could be put into operation upon arrival at the site with the use of hand tools, only.

The plant is a self-contained unit of 50 tons per hour capacity. No crane or auxiliary equipment was allowed in its handling, a vital factor for performance under military conditions. All conveyors and auxiliary equipment are mounted on the main plant units. The triplex plant can be placed in operating position, conveyors positioned, etc., with the use of hand tools and plant mounted winches and hydraulic rams. Auxiliary cranes and jacks are not necessary although they may be used if available. The plant is returned to traveling position with the same equipment.

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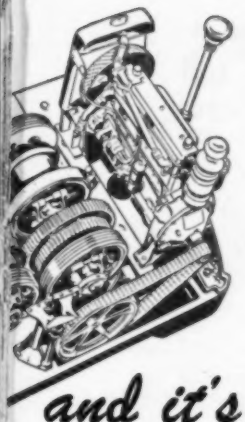

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by Glueckert
"You're the new maintenance man, I presume?"
"We had to hire a pilot during the rainy season."
"Okay if it's 20 years ahead of its time, come see me again in 20 years."
"The only explanation I can come up with is that this section was laid the day after payday."
"I said put a w-l-n-c-h on it."

AMSCO dippers keep the heat on loading at 50° below zero

North Pole weather plus loading "pure rock" are no problems to Manganese steel dippers.

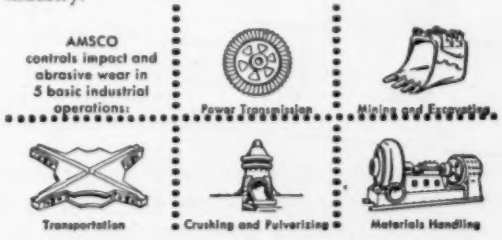
In June, 1948, an iron mine in the northwestern Adirondacks installed its first AMSCO dipper. It's still going strong—16 hours a day, 7 days a week! Old type dippers used previously lasted as little as one week. And the mining company had to employ four welders full time to keep them going.

In design, too, AMSCO dippers are made for the type of punishment low grade ore and low temperatures inflict. Except for tooth work, the only repair has been the replacement of the heel band after two-and-a-half years of this kind of vigorous operation.

Of course, not all mining and excavating operations are as tough as this one . . . but it's a good example of how to save money and manpower through the use of AMSCO products.

WHENEVER YOU MEET A PROBLEM OF WEAR CAUSED BY IMPACT AND/OR ABRASION . . .

. . . find out about longer-lasting, dollar saving AMSCO manganese steel . . . world's largest producer of Manganese Steel Castings for all industry.



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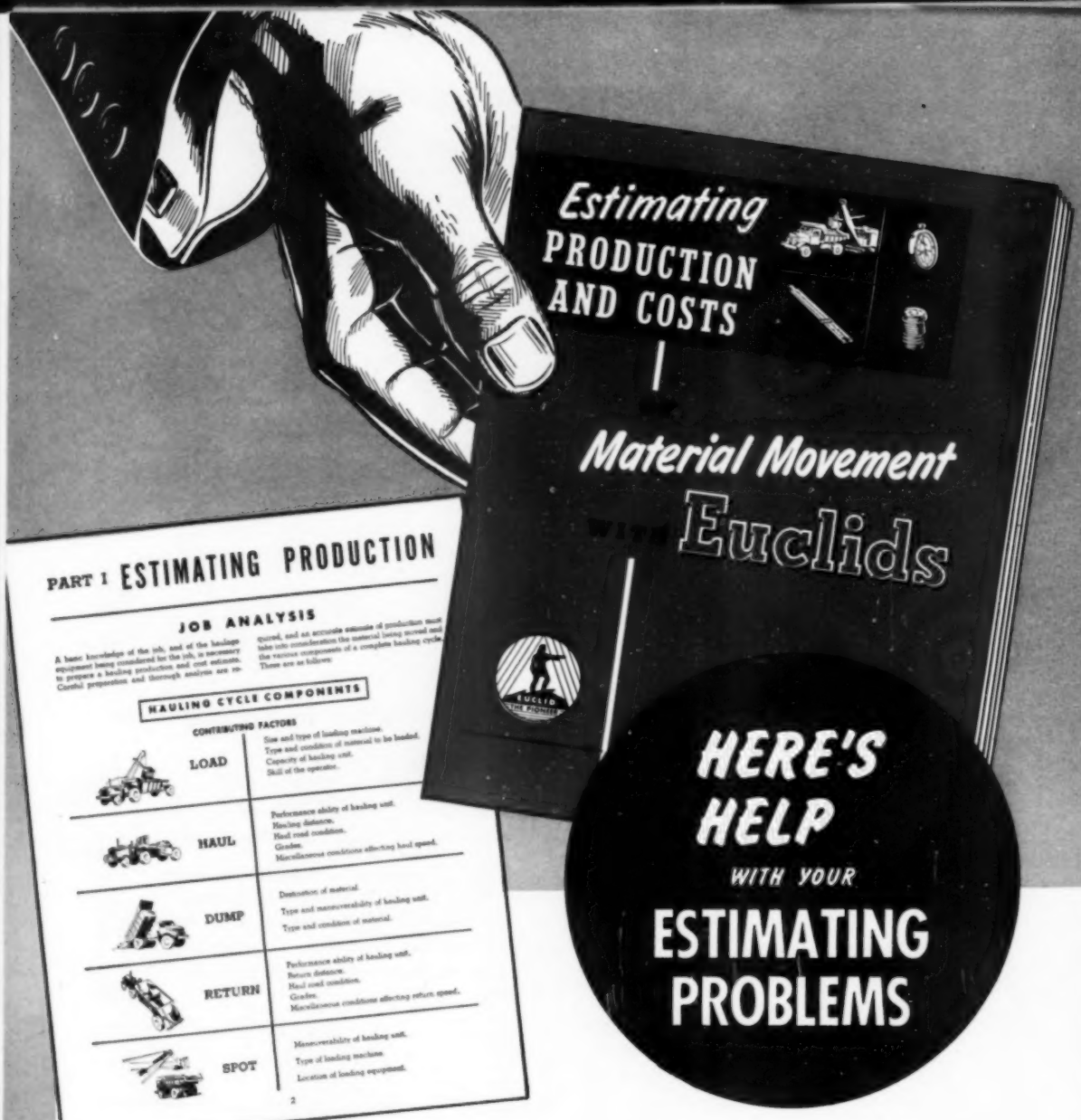
Other Plants: New Castle, Del., Denver, Oakland, Cal., Los Angeles, St. Louis. In Canada: Joliette Steel Division, Joliette, Que. Amsco Welding Products distributed in Canada by Canadian Liquid Air Co., Ltd.



HERE'S HELP WITH YOUR ESTIMATING PROBLEMS

This enlarged and revised Euclid manual shows how to make a job analysis and provides a method of estimating production and costs for off-the-highway hauling equipment. It will enable you to determine the number and size of hauling units required for any job, and the estimated cost of moving material per cubic yard or ton.

You'll find the data contained in this book helpful and easy to use. If you haven't received a copy, contact your Euclid Distributor, or write us direct . . . on your letterhead, please. There is no charge or obligation, of course.

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EUCLIDS *Move the Earth*

Equipment You Ought to Know About

Slusher Block

Manufacturer: Sauerman Bros., Inc., 574 S. Clinton St., Chicago 7, Ill.

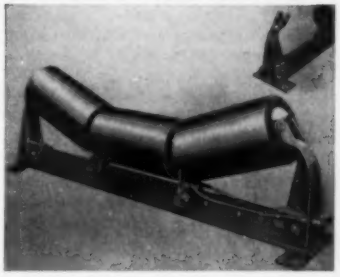
Claims: This sheave-block is designed essentially for slushing, mucking, and wrecking duty. The block resembles the standard Durolite blocks in its general specifications. Sheaves and frame are of differential heat treated alloy steel. Swivel fittings are quick opening and free moving. A bead cast in the frame protects rim of sheave, prevents fouling of cable. Important new features are: (1) wider, flatter sheave groove to permit use of larger cable than standard block of same diameter; (2) extra wide throat opening to pass knotted cable; (3) lighter weight than other blocks of similar capacity, making for easier handling in tight places.

Troughing Roll

Manufacturer: Universal Engineering Corp., Cedar Rapids, Ia.

Claims: A new, heavy duty, grease-type troughing roll assembly for belt conveyors which features simplified greasing from one side, Timken bearings, and self-cleaning mounting brackets has been developed.

The simplified greasing of all bearings from one side eliminates the necessity for a walkway on both sides of the conveyor. Greasing is accomplished through readily accessible fittings with flexible automotive type grease tubing carrying lubricant to



middle and extreme end troughing roll bearings. The tubing is designed to take high grease gun pressures. It withstands rough handling during shipment, and because of its flexibility, breakage due to vibration is eliminated.

The troughing rolls are mounted on self-cleaning brackets inclined at a 2.5° angle toward the flow of material to keep the conveyor belt in alignment. Extreme end bearings are protected by all steel guard shields, preventing damage from material dropping off the belt and jamming between the troughing roll and the end bracket.

Grease-type troughing rolls are available in 5 and 6 in. diameters, and in 18, 24, 30, 36, and 42 inch widths.

Torque Converters

Manufacturer: Caterpillar Tractor Co., Peoria 8, Ill.

Claims: Factory-installed torque converters can be provided for six sizes of Caterpillar industrial engines. Diesels with converters are being used to power excavators, cranes, logging yarders, and other equipment.

On heavy and varying loads, these torque converters allow the engines to maintain a continuously high output. Turning effort is multiplied considerably at low output speeds. When loads are lifted or lowered, as in crane operation, the converter facilitates the

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"pick up" of a standing load or the braking of a load being lowered.

Diesel engines available with torque converters range from 70 to 500 brake hp and include the D397, D386, D375, D337, D318, and D315.

With the smaller, in-line engines — D337, D318, and D315 — power can be delivered to the converters with or without a clutch, or with a clutch and reversing gear. Output arrangements include either a stub shaft or chain housing, the latter available in two sizes.

Converters for the three larger, V-type engines—D397, D386, and D375 —may also be installed with or without a clutch. They may either be direct-coupled to the engine or chain driven. A stub shaft is provided on the output end of the converter.

The torque converters mentioned above are Twin Disc models that use ordinary Diesel fuel as hydraulic fluid, making it possible to attach a charging device that draws from the engine fuel supply.

Lube Oil

Manufacturer: Shell Oil Co., 50 W. 50th St., New York, N. Y.

Claims: Shell Rimula oil, now being marketed to a wide range of basic industries, features a combination of additives never before attained on a commercial basis and is designed to substantially extend the serviceable life of automotive type Diesel engines as well as certain gasoline engines operating in some industrial stop-and-go, low temperature service. Extensive laboratory and field tests have shown that this highly fortified oil cuts down engine wear from corrosion and fouling, with consequent reduction in oil consumption and frequency of costly overhauls.

Rimula oil was developed to solve certain problems of engine wear and fouling caused by certain operating conditions that are aggravated by low loads, high sulphur fuels, and low temperature operations. These problems had been brought to the attention of Shell scientists by Caterpillar Tractor Co. engineers and a considerable amount of cooperative testing was done during this development. In addition to this, its advantages have since been found most pronounced in certain Diesel engines designed for increased power output on low grade fuels.

Data indicates that Rimula oil effectively combats sludge and lacquer deposits and extends significantly serviceable life of engines by reducing cylinder, ring, piston, and bearing wear.

One company manufacturing gasoline-engine fork lift trucks, used Rimula oil to eliminate severe exhaust smoking. They found that engine life was doubled because of clean engine operation. Overhaul and replacement cost was reduced by $4,000 a year.

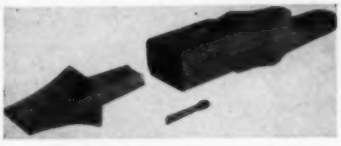
Bucket Tooth

Manufacturer: Blaw-Knox Co., Farmers Bank Bldg., Pittsburgh 22, Pa.

Claims: Of interest to operators of clamshell buckets in the excavating field is a new reversible and replaceable cutter. The new unit replaces the old type, one piece tooth presently used.

Similar in principle to the two-part tooth used so successfully in draglines and trenchers, the new tooth consists of a base which is permanently attached to the scoop, or lip, in the usual manner, and a reversible and renewable tip which fits into a slot and wedges itself into the base.

Replaced in a fraction of the time required to install old style teeth, the new unit not only reduces costly shutdown time but further effects savings by requiring only the replacement of that portion of the tooth which wears out.



Bases and cutters are available from stock for many Blaw-Knox buckets now in use and in addition blank bases (without drilling) can be applied to bucket sizes where the bolt hole patterns come within a range of the base outline. The adaptability to existing buckets can be determined by the factory from the serial number of the bucket.

Electrode Holder

Manufacturer: Tweco Products Co., Wichita 1, Kan.

Claims: A new, lightweight, 300 ampere electrode holder is known as the Model A-732 Twecotong holder. It features a lightweight, high copper alloy for maximum conductivity. Raised

upper lever allows plenty of room for the operator's hand with a welding rod in the jaws. Body and tip ends of the holder are insulated with patented "Super-Mel" insulators. Tip end insulators are interchangeable.

The electrode holder will handle from 7/32 in. through 1/16 in. electrodes. The welding cable may be soldered or clamped mechanically to the body of the holder. Only 9¼ in. in length, the new holder makes it easy for the operator to weld in "hard to get at" places. The holder is designed for high speed production, pipe welding, and job shop work.

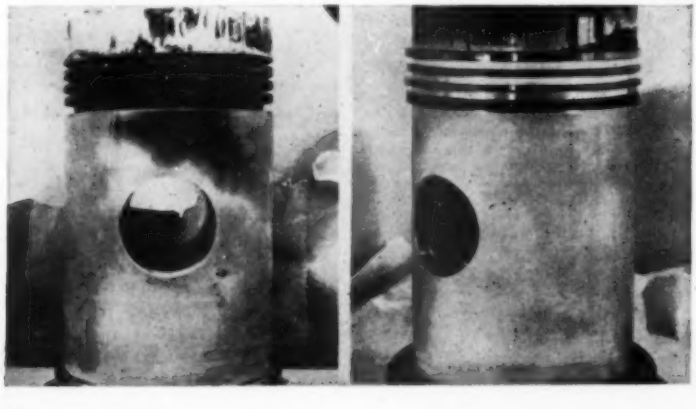
¾ Yd. Excavator

Manufacturer: Findlay Division, Gar Wood Industries, Inc., Findlay, O.

Claims: The new Gar Wood 75 standard and heavy duty ¾ yd. excavator and 20-ton truck crane, features power actuated drum clutches, direct right angle drive, optional hydraulic coupling and the new foundation borer attachment.

Operated by direct, extra-sensitive manual controls, the excavator uses the engine's power to engage the heavy duty clutches. The exclusive right

• Comparative conditions on a Diesel earth moving tractor engine show that when Rimula oil is used, at right, there is considerably less liner wear, top ring wear, and much less lacquer than when a standard heavy duty oil is used on the same engine, at left.



ROCK RATED!

FOR ROCK BOTTOM COSTS

P&H MAGNETORQUE*

puts an end to the old swing frictions

We'll make this promise: You'll never have to "baby" this machine, even in the heaviest going! It's *built* for it — all-welded of alloy steels throughout, the toughest construction known. *It means steady digging.*
But the big pay-off in extra production comes with Magnetorque electric swing — enough faster to deliver 5 cycles to 4 on other machines in the 2½ yd. class. And the "time-outs" for adjustment and replacement of swing friction linings can now be salvaged for increased yardage. Magnetorque lasts the life of the machine.

*T.M. of Harnischfeger Corporation for electro-magnetic type clutch.

HARNISCHFEGER
CORPORATION
4517 W. National Avenue • Milwaukee 46, Wis.

Ask today for facts about the 955-A. Also the Model 1055 — its companion machine with 3½ yd. capacity.

POWER SHOVELS • CRAWLER AND TRUCK CRANES • OVERHEAD CRANES • HOISTS • ARC WELDERS AND ELECTRODES • SOIL STABILIZERS • DIESEL ENGINES • PRE-FABRICATED HOMES

angle drive, by transmitting power through a universal coupling for lasting alignment, reduces fuel consumption insuring the smooth flow of power and eliminates the maintenance, noise, slack, and back-lash problems of chain drives. An optional hydraulic coupling absorbs the shock loads of rugged excavation and combined with the power actuated clutches and direct drive, retains the "feel" for the smoothest crane performance.

Completely convertible in the field to shovel, crane, dragline, clamshell, trench hoe or pile driver, the 75 is also available as a completely convertible, factory installed foundation borer. This attachment combines belling and boring into one operation.

Other features of the 75 include: All-welded, boxed-section machinery deck providing strength without dead weight; self-cleaning, non-clogging crawler tracks that reduce maintenance by minimizing the number of meshing parts; worm driven boom hoist with safety lock for absolute safety to men and machines; non-swaying, hooked conical rollers running in a double-flanged path; and effortless, instant vacuum controls for steering and dipper trip.

In addition to the standard duty and heavy duty basic machines, the 75 is offered as 20-ton truck crane.

Radio Line

Manufacturer: Motorola, Inc., 4545 Augusta Blvd., Chicago 51, Ill.

Claims: A new line of radio communications equipment operates in the 450-470 mc. band. This equipment was designed to meet the demand of the many businesses, industries, and individuals who have found an urgent need for 2-way radio, but were unable to qualify under existing FCC regulations.

Under the present regulations, those who were previously eligible for assignments in the lower frequency bands, but found themselves restricted because of spectrum congestion, will now be able to obtain FCC approval in the 450-460 mc. band. The 460-470 mc. band, known as the Citizens' Radio Service band, is available to those individuals and commercial enterprises who were completely ineligible under the previous regulations.

New receiver design features include sealed, silver plated cavities for optimum R.F. signal pre-selection characteristics, triple conversion in conjunction with the well-known Permakay filter, automatic frequency control and a standby drain-saver circuit.

The transmitter employs nine tubes, all of which may be easily obtained from reliable domestic manufacturers. The IDC (Instantaneous Deviation Control) circuit provides precise limiting of carrier excursions. Whether the operator whispers or shouts, full intelligibility is always realized. The line includes mobile units for 6 or 12 volt DC operation. Associated base station models are available with local or remote control facilities.

Work Gloves

Manufacturer: Riegel Textile Corp., P.O. Box 170, Grand Central Station, New York 17, N. Y.

Claims: A savings of at least 40% to industrial users of canton flannel work gloves has been made possible by the application of a new principle in their manufacture.

Plastic dots, permanently set into standard 10 ounce flannel, make the new glove outlast conventional canton flannel gloves of this type by more than two-to-one. U. S. Testing Co. reports show that the plastic dot fabric outlasted the 10 ounce canton flannel fabric by well over two-to-one. Their report supported the findings of the manufacturer which had also conducted exhaustive tests in their own laboratories and in normal everyday operations in large industrial plants.

The new "Plastic-Dot" will cost slightly more than ordinary 10 ounce canton flannel gloves, an increase that is outweighed by its longer life, according to William Berry, Riegel's executive vice president.

"We can assure purchasers that these Plastic-Dot gloves will give them at least twice the abrasive wear," he stated, "and this translates itself into a savings of over 40%." He also pointed out that the new product would still retain all the lightness, flexibility, and comfort found in regular canton flannel gloves.

Truck Improvement

Manufacturer: International Harvester Co., 180 N. Michigan Ave., Chicago 1, Ill.

Claims: Green-tinted glass, reducing both glare and heat and enhancing driver visibility and comfort, will be made available in all International truck cabs and panel trucks.

The tinted glass, called Solex Duplate, a product of Pittsburgh Plate Glass Co., will be standard equipment on the new short-dimension "102 space saver" Roadliner models. It will be optional at extra cost in all other models.

The glass is credited with absorbing much of the sun's heat and reducing eyestrain without sacrificing the light transmission characteristics of high-quality glass.

The new feature is expected to add both safety and comfort to motor truck operation.

Drill Bit

Manufacturer: Rock Bit Sales & Service Co., Philadelphia 25, Pa.

Claims: Following the acceptance of the chisel-type Intra-Set drill steel, in which steel and carbide bit are integral, this company now offers four-point Intra-Set steel. This is made in 1⅛ in. to 2¼ in. gauge sizes and in lengths up to 12 feet, with shanks to fit any hammer. Since the alloy drill steel and carbide bit are of one piece construction, there are no attachments to loosen, bind, or strip. In field operations,

"On schedule" on the Turner Turnpike

Hustling, burly "Caterpillar" DW21 Tractors are ironing out the wrinkles in the Oklahoma landscape for a high-speed highway *on schedule*. The Turner Turnpike, slated for completion in December, will run 88 miles from Oklahoma City to Tulsa.

When finished at an estimated cost of $26,900,000, the turnpike will have two 24-foot lanes separated by a 15-foot raised median. The highway, built *for* speed, is being built *with* speed. A fleet of five "Cat" Diesel DW21 Tractors with matching scrapers are moving dirt from cut to fill for S. E. Evans Construction Co., Oklahoma City, Okla. Reports Orvil Cranfill, superintendent of S. E. Evans:

"With 2,000,000 yards of dirt to move, we are moving more than 1,200 yards daily with each machine. We are surely on schedule."

The barrel-chested "Cat" No. 21 Scrapers are push-loaded on the job in about one minute. They spread on the run smoothly and evenly in 20 seconds. Carrying an average load of 22 yards, they whip through 9 to 10 trips an hour each with an average haul of 1,500 feet. Peter Kiewit Sons Co., Omaha, Neb., another turnpike contractor, also is using the swift, efficient DW21 unit.

By design this big yellow team insures quick action. Precision engineering, premium materials, anti-jackknife devices, large brakes, and big capacity eliminate down-time and keep you on schedule.

"Caterpillar" means speed; speed means money. Your "Caterpillar" Dealer can show you how to step up your construction pace. No matter what your earthmoving job, he has equipment which is the right size to do it quickly and efficiently.

CATERPILLAR TRACTOR CO. • PEORIA, ILLINOIS

CATERPILLAR

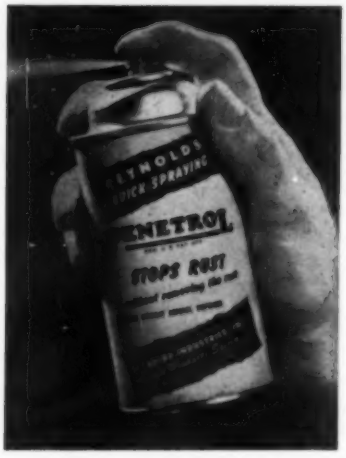
REG. U. S. PAT. OFF.

DIESEL ENGINES
TRACTORS • MOTOR GRADERS
EARTHMOVING EQUIPMENT

the four-point Intra-Set steel drills faster, gauge loss is less, sharpening is required less frequently, longer life results, and a neat round hole is drilled for follow-up work.

Rust Preventative

Manufacturer: Reynolds Industries, 4500 Euclid Ave., Cleveland 3, O.



Claims: Penetrol, used for over 50 years in bulk by major steel, marine, and bridge builders as a fine rust preventative, is now available in handy 12 ounce aerosol dispensers.

Penetrol not only quickly and easily removes rust, but when sprayed on rust covered metal, joins with the rust to stop rust. This is the time saving feature of the chemical, since the rust does not have to be removed. Oil paints, oil enamels, varnishes, and many synthetic coatings may be applied over Penetrol.

It has many uses in the automotive field today. One of these is for undercoating, when the owner does not choose to spend $35 or $40 for a conventional garage undercoating. By spraying the undersides with Penetrol, a coat may be had for $2.19.

It is also used extensively for spraying on trucks and tractors to stop rust before storing for the winter or leaving outdoors for long periods of time.

'Pick-Up' Excavator

Manufacturer: Badger Machine Co., Winona, Minn.

Claims: The conventional HOPTO "Pick-Up" excavator is now equipped with an independent power source. The trailer mounted machine is equipped with a Wisconsin VF4 air cooled motor. The completely hydraulic machine has an approximate weight of 3,000 lbs. In the traveling position the length of the excavator is 8 feet 10 inches with a width of 7 feet 11 inches on a single

tire mounting.

The hydraulic system is Vickers with an operating pressure of 1,000 psi. In one hour the machine is capable of trenching 60 feet to a depth of 6 feet in average soil. The 24 in. bucket can handle 45 yds. of soil hourly. A few of the primary uses for which the machine was intended are: Water and sanitary systems, septic tanks, footings, basements, curb and gutter work, drainage, irrigation, stock ponds, and pit silos.

Diesel Truck

Manufacturer: Reo Motors, Inc., Lansing 20, Mich.

Claims: The new model is the F-23DT, a high-speed truck-tractor powered by a new, light-weight, Cummins JBS-600 Diesel engine. Combination of the new, high-compression engine and a specially-designed chassis gives Diesel operators important weight advantages.

FASTER, EASIER BLAST HOLE DRILLING

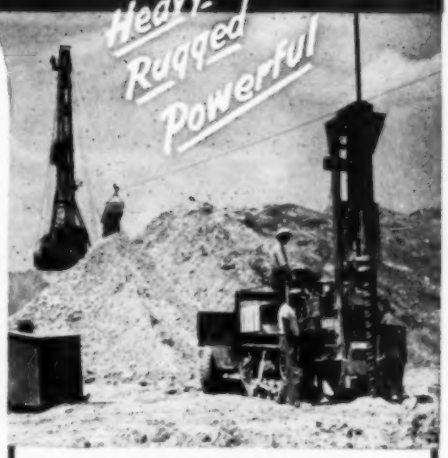
McCarthy Auger Drills

A McCarthy Drill, working eight hours, can keep the big shovels busy around the clock.

Time and again McCarthy Drills get the nod from operating men . . . men who've made actual tests proving that no other equipment can match a McCarthy for speed, stamina and versatility.

At The Bessemer Limestone and Cement Company, Bessemer, Pa., one McCarthy unit averages 90 ft. per hr., working through a facing of blue shale 34 ft. deep. Holes are drilled on 18-ft. centers. Two men handle the whole job, including setup and moving. Another McCarthy unit has been installed in a different section of this quarry and it, too, is breaking all previous records for fast, low cost shot hole drilling. McCarthy Drills operate with all types of power units on all types of mounts. Write today for full facts about this finger-tip controlled money saver.

McCarthy truck-mounted Horizontal Drills keep men and equipment off of the ground, up out of the mud. All McCarthy units are adjustable to necessary drilling angles. Finger-tip controls and six-foot interlocking auger sections provide unlimited drilling opportunity. Self-propelled models also available.



THE SALEM TOOL CO.
773 S. ELLSWORTH AVE.
SALEM, OHIO • U. S. A.
SALEM

The standard F-23DT chassis and cab with 20 gallons of fuel and all tractor equipment, except the fifth wheel, weighs approximately 9,475 lbs. The F-23DT has a gross tractor rating of 50,000 lbs. and a 130 inch wheelbase. Reo plans to add other models to its Diesel line as the supply of engines becomes more plentiful. The Cummins JBS-600 engine develops 150 hp at a governed speed of 2,500 rpm, and 360 foot pounds of torque at 1,400 rpm. Weight of the complete power plant, including clutch and transmission, is 1,825 lbs.

The six-cylinder, valve-in-head engine has a displacement of 401 cubic inches, a 4⅛ by 5 inch bore and stroke, and a compression ratio of 15.1. The Cummins JBS-600 features re-

placeable, wet cylinder sleeves. Other engine features include a seven-bearing crankshaft and full-pressure lubrication throughout.

"More-Load" design is followed in the construction of the F-23DT, with its short wheelbase that reduces turning radius, both left and right, to a few inches over 21 feet. The unit also has a new Timken, two-speed, double reduction axle designed for highway operation, the QT-300.

Through new design, Timken has produced in this axle a unit with the same capacity as its "Q" series, but with a weight saving of 136 lbs. under its Q-300.

The F-23DT has 10.00 x 20 tires as standard, with 10.00 x 22, 11.00 x 20, or 11.00 x 22 optional.

Liquid Level

Manufacturer: Foote Co., Inc., Nunda, N. Y.

Claims: A new liquid level for attachment to the Adnun black top paver gives positive leveling control for black top paving and the spreading of aggregate. It permits leveling up old road and will allow accurate correction for any slope at any station. It can hold a level grade without modifying the desired crown and will level up old shoulder and blend the course into an old crown. This simplifies the straightening up of old and wavy road by simple adjustment. The liquid level consists of reading glasses mounted vertically on the cutter bar supports.

A. Leschen & Sons Rope Co., St. Louis 12, Missouri
In business only to make wire rope — better wire rope — since 1857.
DISTRIBUTORS IN ALL PRINCIPAL CITIES

NOT in the *Contract*

Daughter had been invited to her first formal dance. She pleaded for a strapless gown, but mother wouldn't hear of it.

After arguing bitterly, they put the problem up to father.

"Let her try it on," advised Dad. "If it doesn't fall down she's old enough to wear it."

A spinster who was the self-appointed supervisor of village morals accused a man of being a drunkard because she had seen his car parked outside a tavern. The accused man made no comment, but the same evening parked his car outside his accuser's door—and left it there all night.

Diner: "I want some raw oysters. They mustn't be too large, but on the other hand, I don't like them too small. Not too soft, but not tough, and not too salty. They must be cold, and I'm in a hurry."

Waiter: "Yes, sir. You want 'em with or without pearls?"

The farmer whose pig was killed by an automobile was raving mad.

Motorist: "Don't worry. I'll replace your pig."

Farmer: "You can't. You ain't fat enough."

The naked hills lie wanton to the breeze.
The fields are nude, the groves unfrocked,
Bare are the limbs of all the trees.
No wonder the corn is shocked.

A girl got a job with an advertising agency to distribute little boxes of candy free to the public. She had finished her day's work when she met an old friend whom she hadn't seen for a long time.

"Oh, Joan," said the friend, "I've just heard that you're going to be married."

"Yes, I am," replied Joan. "We're going to be married next month."

"How wonderful," said the interested friend. "What are you doing now?"

"Nothing much," was the reply. "Just giving away free samples."

"Gus pulls that on every new operator we get!"

Customer in restaurant — "Waiter. those veal chops don't look so tender to me."

Waiter—"Sir, I used to be a butcher, and I can tell you that less than a month ago those chops were chasing a cow."

Customer — "Yes, but not after milk."

The old mountaineer grandpa was sitting in his favorite old rocker on the porch of his little cabin. He was slowly rocking east and west. Sitting, nearby, rocking north and south, was his 42-year old son.

"Sonny boy," drawled the old man. "It's about time you learned not t'wear yerself out thataway. Rock the way the boards run and save yer stren'th."

As the speaker of the evening sat at the banquet table, during his introduction, he coughed and dislodged his upper plate. It fell to the floor and broke.

A guest at his side realized the man's plight, dug into his pocket and came up with a set. The speaker-to-be tried them. They were too big. The helpful guest supplied another set. They were too small. The third set fit.

The speaker got through his address perfectly with the borrowed teeth and, as he sat down, he returned them to his neighbor with profuse thanks. "By the way," he said, "are you a dentist?"

The helpful guest shook his head. "No. An undertaker."

"If we could only use the $2,000 in my savings account to buy a new car, we wouldn't have to pay any financing charges," a lady said to a bank teller.

"Then why don't you?" asked the teller.

"Because my husband would ask how I saved so much money. If I told him, it would spoil his fun. When he began playing the horses, I offered to place the bets for him. Instead, I took them myself. When his horse won, I paid him off, and when he lost, I put the money in my savings account."

Little Jimmie's fourth birthday was drawing near. When his parents asked him what he would like for a present, he said he wanted a dog.

"Why Jimmy," said his mother, "You don't need a dog. You already have a nice blue plush one."

Frowning, the little fellow replied: "That's not the kind. I want one with fleas."

BETTER FRAGMENTATION

In shooting for pay loads, you will find that you can get better fragmentation if you

"Hook up and Detonate with PRIMACORD"

For two good reasons: 1) Primacord fires every cartridge in every hole with the added force of a primer cartridge. 2) By proper hook up the front row of holes will go a split second before succeeding rows, thus relieving burden and resulting in better fragmentation.

Wound on light weight spools, easily carried, Primacord is easy to handle on the job. Use it for trunk line hook ups and down hole branch lines. It fires instantaneously from a blasting cap yet cannot be set off by friction, sparks, ordinary shock or stray currents.

To keep those trucks rolling keep PRIMACORD unrolling

Ask your explosives supplier or write us direct for further facts. The Ensign-Bickford Company, Simsbury, Connecticut.

Also Safety Fuse since 1836

There's a type for every job. PLAIN PRIMACORD for shallow holes and surface trunk lines; REINFORCED PRIMACORD for deep holes and resistance to abrasion; WIRE COUNTERED PRIMACORD for deep, ragged holes; and PLASTIC REINFORCED PRIMACORD for deep holes and unusual wet conditions.

Use PRIMACORD®

The PROVED and APPROVED DETONATING FUSE

New trade literature

Subject: **Drilling Operations and Equipment**

Content: Brief, detailed descriptions of drilling operations and equipment have been prepared for easy reference in two colorful folders. The literature catalogs many different types of McCarthy drills designed for blast hole drilling, earth moving, tunneling, and strip mine coal recovery work. Material includes: installation photographs, case history figures, specifications, and a listing of available augers, cutting heads, bits, and other drilling accessories.

Where to get: The Salem Tool Co., Salem, O.

Subject: **Safety**

Content: John A. Volpe, president and treasurer of Volpe Construction Co., Malden, Mass., told construction men of *100 Ways to Save a Buck* at the construction section of the National Safety Congress held in Chicago last year. His talk is reprinted in a 30-page booklet to help other contractors set up and maintain the kind of safety program Volpe found so successful. Some of the points covered are: The necessity of publicity for your program, development of a program tailored to each job, creation of incentive, indoctrination of new employees, the use of your insurance carrier, adequate first aid facilities, protection of the public, promotion of good housekeeping, and the importance of a continuing program.

Where to get: Lumbermans Mutual Casualty Co., Mutual Insurance Bldg., Chicago 40, Ill.

Subject: **Torque Converter**

Content: A new 4-page illustrated Bulletin, No. TC-639, presents information on the Torcon heavy-duty automatic hydraulic torque converter. Designed to handle variable loads at variable speeds, this transmission combines a hydraulic torque converter and hydraulic coupling in a single unit and retains the advantages of both. Illustrated in the catalog are the three elements of the unit: pump, turbine, and reaction member. Each component is a single-piece aluminum casting, combined without close clearances for operating efficiency and simplicity of servicing. Among advantages listed are increased output through maximum utilization of engine horsepower, versatility of application, reduction or complete elimination of shock to equipment, reduced maintenance on all driving and driven mechanisms, and reduced operator fatigue. Typical applications of this heavy-duty unit are listed and depicted. Among these are shovels, cranes, rail cars, front-end loaders, road machinery, oil well rigs, tractors, mining machinery, and logging equipment. Also a partial list of users is included.

Where to get: The Torcon Corp., 1144 W. 5th St., Ashtabula, O.

Subject: **Scraper Line**

Content: A new booklet on a scraper line will be of interest to heavy equipment men in the construction and mining fields. Specifications are given for the nine sizes of scrapers offered by Caterpillar from the No. 40 for use with the D4 track-type tractor to the No. 90 with a heaped capacity of 27 yds. for use with the D8. Intermediate sizes include the No. 60, No. 70, and No. 80 scraper for use with track-type tractors and the No. 10, No. 15, and No. 20 scraper for use with wheel-type tractors, as well as the DW21-No. 21 tractor-scraper combination. There are more than 20 illustrations, including photographs of actual working conditions and drawings showing special features.

Where to get: Caterpillar Tractor Co., Peoria 8, Ill. (Form No. 30375)

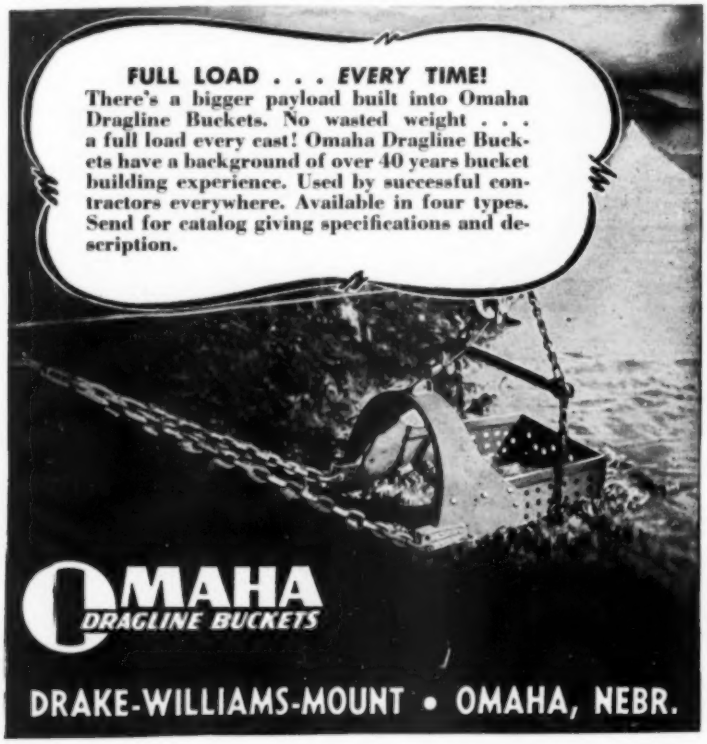
Subject: **Arc Welding**

Content: Volume IX, No. 1, *Hobart Arc Welding News*, a 16-page booklet of interesting photographs and articles on welding from all over North America, is now available. Copies are mailed free of charge to anyone interested in welding. Many of the articles feature time-and-money saving applications.

Where to Get: Hobart Brothers Co., Hobart Square, Troy, O.

Subject: **Winches**

Content: A new bulletin describing the capacities and applications of the Model 2U and 3U Low-Mount winches has been issued. The 2U which weighs 330 lbs. has a rating of 15,000 lbs. while the 3U weighs 375 lbs. and has a 20,000 lbs. rating. The bulletin also explains installation of the winch which can be mounted in the back of the cab and at the rear or front of the chassis. In back of the cab the winch leaves the entire body for the payload and is available with cab controls. In rear chassis mounting the rope can

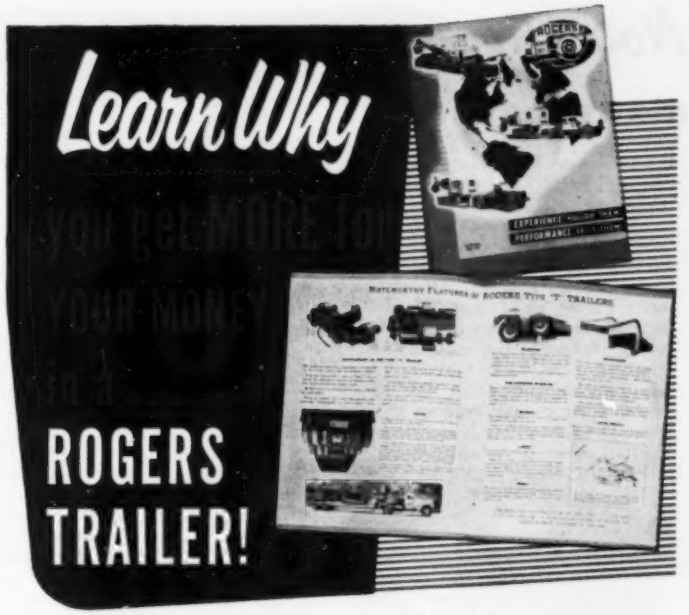

FULL LOAD . . . EVERY TIME!
There's a bigger payload built into Omaha Dragline Buckets. No wasted weight . . . a full load every cast! Omaha Dragline Buckets have a background of over 40 years bucket building experience. Used by successful contractors everywhere. Available in four types. Send for catalog giving specifications and description.
OMAHA
DRAGLINE BUCKETS
DRAKE-WILLIAMS-MOUNT • OMAHA, NEBR.

be used for direct pull from the rear or it can be passed under the body and used for loading. Front mounting makes the winches available for pulling the truck itself out of ditches or rugged terrain.
Where to get: Customer Service Dept., Gar Wood Industries, Wayne, Mich. (Bulletin No. 149T)

Subject: **Steel Drafting Table**
Content: A new bulletin features a 4-post steel drafting table which is in keeping with the trend to well designed steel office furnishings. Except for the kiln-dried soft wood top and Prestwood dust cover, the entire table is of "lifetime" steel construction. The sturdily based 4-post design with steel footrest assures the firm support necessary for accurate drafting work. Two exclusive steel adjusting devices raise and lower the table top. The bulletin describes three drafting table models, each available in several board sizes. One model has an all steel shallow reference drawer plus a separate, locked tool drawer; another has the tool drawer only. The third model comes without drawers.
Where to get: Stacor Equipment Co., 473 Troy Ave., Brooklyn 3, N. Y.

Subject: **Industrial Reduction Gears**
Content: A four-page folder illustrates industrial, farm, and construction machinery driven by engines equipped with S-N industrial reduction gears. It shows a few of the many possible applications including pumping, dredging, quarrying, ditching, and sand pit dragging. The folder describes the part played by heavy duty S-N industrial gears in transmitting full power from the engine to the load at the most economical or necessary speed for the driven equipment. It also contains photographs illustrating the steps taken in designing, manufacturing, testing, and inspecting gears at the Snow-Nabstedt Gear Corp., which has been in operation for 47 years.
Where to get: Snow-Nabstedt Gear Corp., 222 Welton St., Hamden, Conn.

Subject: **Automotive and Construction Equipment**
Content: This book is a study in the economical use of automotive and construction equipment as it relates to management, capacity, and investment. It will prove helpful to civil engineering students as well as owners.
Where to get: Jacksonville Publishing Co., Box 3620, Washington, D. C. ($4.50)



You'll find the new catalog interesting and informative in terms of the complete line of Rogers Trailers, one or more of which will best suit your job hauling requirements.

A "point by point" comparison of Rogers specifications and construction features with those of other trailer makes is your best assurance that you'll get MORE for your Money in a ROGERS TRAILER.

MAIL THIS COUPON NOW!
ROGERS TRAILER

EXPERIENCE builds 'em — PERFORMANCE sells 'em

ALBION, PENNA.

SEND CATALOG NO. 115

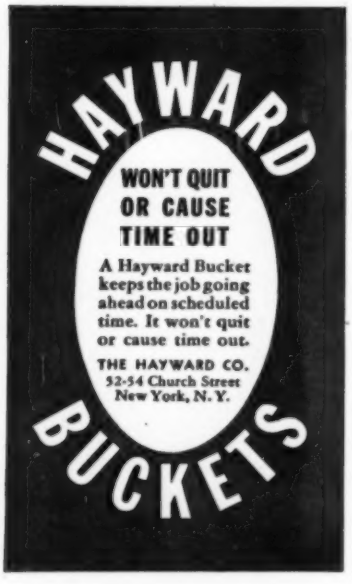
Name.....
Title.....
Company.....
Address.....
City.....Zone....State.....

A Rogers Type "D" Trailer

Notes from the manufacturers

Allis-Chalmers Manufacturing Co., Milwaukee 14, Wis. has named A. E. Dorn industrial sales manager, tractor division. He succeeds R. M. Stone who has resigned to become associated with the Allis-Chalmers industrial dealership in St. Louis. Dorn has been Pacific coast territory manager for the firm since 1943, supervising sales including industrial products in the western states, British Columbia, and Alaska. He started with the company in 1934 and most of his service has been in industrial sales. He was an industrial salesman at the Omaha, Neb. branch, assistant supervisor of grader sales, and southwest industrial territory manager. L. W. Davis, branch manager at Oakland, Calif., succeeds Dorn as Pacific coast territory manager. He joined Allis-Chalmers in October, 1939. He has been assistant branch manager at Los Angeles, branch manager at Pocatello, Ida., and on Jan. 1, 1951 was transferred to the managership at Oakland.

American Hoist and Derrick Co., St. Paul 1, Minn. announces the election of John E. Carroll to the board of directors. Carroll, vice president of sales graduated from the engineering school, University of Minnesota, and joined American Hoist in 1937 as district representative. He traveled successively the Texas, Chicago, and later the west coast territories for the company. In 1945 he resigned his sales position to become a partner in the firm of Harron, Rickard, and McCone Co. of southern California, managing the construction machinery division. Carroll rejoined American Hoist in 1949 as general sales manager and was made vice president of sales in 1951.



Blaw-Knox Division, Pittsburgh, Pa. has appointed James H. Elkus assistant manager of the Blaw-Knox Division of Blaw-Knox Co. In this new post, Elkus will have responsibility, under the division manager, for all departments of the unit at Blawnox, Pa., including sales and engineering. Elkus joined Blaw-Knox in 1933 as a design engineer, did industrial engineering at several of the plants for some years, and since 1943 has been manager of methods and procedures for the company. Since 1949 he has also been active in the company's foundry modernization program and in planning facilities for defense production. Elkus is a graduate of Yale University's school of mechanical engineering. Also announced was the appointment of W. J. Kalmeyer as works manager of Blaw-Knox Division. In this capacity, Kalmeyer will be in immediate charge of all plant operations, plant purchasing maintenance, and production control. Kalmeyer is a graduate of the school of engineering of Carnegie Institute of Technology. He started with Blaw-Knox in 1930 as an engineer and subsequently worked in an engineering capacity on virtually all products of the division. He became assistant plant manager in 1950 and manager in 1951.

The Colorado Fuel and Iron Corp., New York 22, N. Y. has appointed Robert F. Bourne, general sales manager of the Claymont Steel Corp., subsidiary. Prior to joining C.F. & I., he was employed as an engineer in the Bureau of Reclamation on the design of various dams and power plants in the western area. Bourne later transferred to the Federal Power Commission in Washington, D. C. In 1941, he was called to active duty in the Army of the United States and discharged with the grade of Lieutenant Colonel in 1946. At this time, he joined The Colorado Fuel and Iron Corp. as a sales engineer. Since that date, he has had various responsibilities among them being manager of export sales, manager of rolled product sales and assistant to the general manager of sales of the Claymont Steel Corp. Bourne succeeds Richard M. Worth who has resigned to enter his own business. Bourne will continue to be located in the Claymont sales offices, Claymont, Del.

Cummins Engine Co., Inc., Columbus, Ind. announces two changes involving sales division personnel. Harold H. Hall, formerly general service manager, is now general manager, Cummins Diesel Export Corp., with headquarters also at Columbus, Ind. Charles C. Sons, formerly eastern service manager, has been named acting general service manager succeeding Hall. Hall joined the organization in 1938 as a service representative in the southeastern region. From 1940 to 1942 he was service and parts manager of the dealership at Memphis, Tenn. During the war years of 1942 to 1945 he served in the U. S. Navy. Returning from service in 1945, Hall became a field service representative for the company working on field testing problems associated with the development of the 275 hp Model NHBS-600 and 200 hp Model NHB-600 Diesels. In March, 1947, he became manager of the dealership at St. Paul, Minn. and held this position until December, 1948 when he returned to Columbus as general service manager. A native of Freewater, Ore., Hall was educated at Rollins College and the University of Florida. Previous to joining Cummins he was equipment superintendent in the construction field, and an erection engineer doing power plant work. Sons is a 1941 graduate of the University of Missouri. He formerly was employed by Curtiss Wright Corp. at Caldwell, N. J., as an assistant project engineer in the propeller design section. He joined the Cummins research laboratory staff in 1947 as a field engineer. In February, 1950, Sons was transferred to the dealership at Hibbing, Minn. and worked on the iron range as a field engineer. Sons returned to the factory at Columbus in January, 1951, when he was named eastern service manager, a position he has held until this new appointment.

Gar Wood Industries, Wayne, Mich. has appointed Leo M. Brown to assistant sales manager. Brown was formerly employed as a district manager serving distributors in Texas, New Mexico, Oklahoma, Mississippi, Arkansas, and Kansas. After

"... opportunity is freely given..."

PAUL M. HAHN
President, The American Tobacco Co.

"Our nation has grown great largely because opportunity is freely given. Only very few people actually make their own 'breaks.' Today, millions of Americans are providing for their personal financial security and at the same time helping in the building of our national defenses. The opportunity to do so is given by business management which affords employees the means of practicing systematic thrift through the Payroll Savings Plan for the purchase of U. S. Defense Bonds."

Nearly seven million employees of industry are "providing for their personal security and at the same time helping in the building of our national defenses."

- they are the men and women who availed themselves of the opportunity referred to by Mr. Hahn—the opportunity to enroll in the Payroll Savings Plan for the systematic purchase of U.S. Defense Bonds.
- they represent a high percentage of their companies' employees—in plant after plant, the averages are climbing to 60%, 70%, 80%—even higher.
- their investment in Defense Bonds—and America—add up to $140 million per month.
- they constitute a large block of the men and women who on December 31, 1951, held Series E Bonds amounting to $34,727,000,000—$4.8 billions more than the cash value of Series E's outstanding in August, 1945.

Not far from you is a State Director of the Savings Bond Division. He will be glad to tell you how easy it is to give your employees a Payroll Savings Plan. Or, if you already offer the Plan to your people, he will show you how to conduct a simple person-to-person canvass of your plant—a canvass intended to do only one thing—to put a Payroll Savings Application Blank in the hands of every man and woman on your payroll. Your employees will do the rest.

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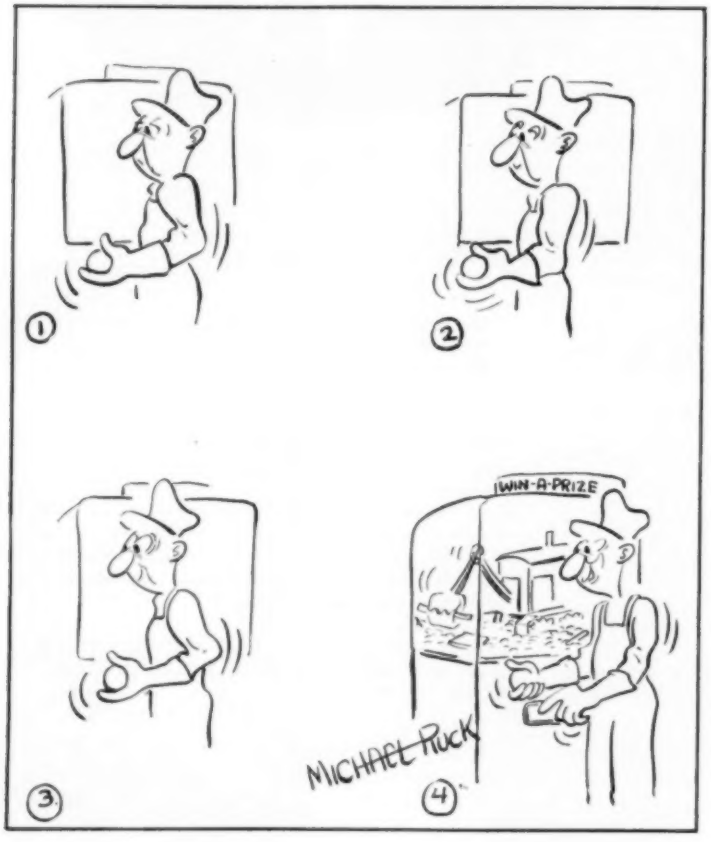
graduating from Ohio State University in 1938, Brown joined E. I. Dupont Co. as a construction engineer in the southwest. From 1942 to 1945 he served with the Army Signal Corps and after his discharge, coached basketball and football for two years in Galion, O. After serving as district manager for Hercules Steel Products and as sales manager for Truck Equipment Co. of St. Louis, Brown joined Gar Wood Industries in 1949. A year later, he was named south central district manager of Gar Wood's St. Paul Hydraulic Hoist Division, the position he held until his present appointment. Edward R. Curry has been appointed to succeed Brown as south central district manager.

After leaving military service in 1946, Curry was employed as a salesman for Southwest Wheel and Rim Corp., Oklahoma City; Firestone Tire and Rubber Co., Truck and Bus Division and the H. and H. Equipment Co., St. Paul distributor in Oklahoma City.

Hyster Co., Portland, Ore, has promoted Robert Lange to head the Washington, D. C. office. A veteran Hyster man, Lange has been with the company 11 years, with extensive experience in the factory shops, inspection, and purchasing departments. As manager of the Washington office he will handle the company's sales to the various government agencies.

Interstate Drop Forge Co., Milwaukee, Wis. has named Donald K. Davis, 43, sales manager of the special products division. Davis has had experience in sales managerial capacities in the industrial and automotive field and also as a field sales engineer. He is an engineering graduate of Wayne University, Detroit. The Interstate Drop Forge Company's special products division manufactures Wedglok universal connecting links and a complete line of Helwig bolt cutters, strap shears, hot line wire cutters, and sheet metal hand tools.

Marmon-Herrington Co., Inc., Indianapolis 7, Ind. marks the 21st anniversary year. The company produces heavy-duty all-wheel-drive trucks, all-wheel-drive Fords, trolley coaches, and motor coaches. Founded in 1931 by the late Walter C. Marmon, of automobile fame, and Arthur W. Herrington, noted automotive engineer, the company has grown from a small custom builder of large multiple-drive vehicles to become the world's largest commercial producer of all-wheel-drive trucks. Marmon-Herrington was originally established to fill the urgent need for multiple-drive vehicles that would perform efficiently on off-road operations—in mud and sand and snow; in deep ditches and on steep, roadless grades. In celebration of its 21st anniversary, Marmon-Herrington has announced a completely new line of heavy-duty all-wheel-drive trucks, known as the "600" series.



Marion Power Shovel Co., Marion, O. announces that the manufacturers division of the American Mining Congress, recently elected as their new chairman John P. Courtright, president and general manager of Marion. Courtright also was re-elected to the division's board of governors for a three-year period. Last year he served the group as vice chairman.

Motorola Inc., Chicago 51, Ill. has named Ed Falls regional manager for the communications and electronics division southwest sales area. This region includes the states of Texas, Oklahoma, Arkansas, Louisiana, and New Mexico. In this capacity Falls will direct the sales and service of two-way radio equipment, power line carrier systems and microwave systems in this region. A former zone manager for the southern California area, Falls succeeds John Jipp who has been appointed to manage the new west coast parts and service department. Falls, who had had a total of nine years association with Motorola in various capacities, came back to the company as a radio communications engineer and was assigned to the southern California area in 1948 after release from the United States Navy where he was a staff radar officer. He has had extensive training with the British radar and research laboratories and took specialized electronics training at the Massachusetts Institute of Technology for three years during his service tenure.

Cummins Portable Tools, Chicago, Ill. has installed a factory service station at 318 Harvard St., Brookline, Mass. The station is staffed with experienced, factory-trained servicemen.

You Can Count on the RED ARCH . . .

in DRAGLINE BUCKETS

Red Arch buckets have what it takes to deliver steady, high output on heavy construction . . . and to stay *on the job.*

One big reason is that they're built of special alloy steels which provide ample strength without excess weight. Another is famous Red Arch design which enables them to load fast and easy . . . carry without bobbing or spilling . . . and to dump quick and clean. Combined with self-cleaning hoist trunnions, heavy-duty runner bars and renewable heel plates, that mean real on-the-job dependability.

Standing up under punishment . . . staying out of the repair shop also means bigger output over the long pull, and lower overall costs. Standardize now on Red Arch buckets and get these big advantages working for *you.* There's a type and size Red Arch bucket for every dragline application . . . ⅜ to 30-yd. Write for complete information.

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TO INQUIRE: Be sure to address your inquiry to the advertiser by using the correct box number. Mail your letter in care of Excavating Engineer, South Milwaukee, Wisconsin. Write each advertiser a separate letter. Do not write us for name and address of advertiser. This information will not be given out. We have no information about the equipment advertised other than that shown in the advertisements themselves.

Lima 1201 Dragline:
80 Ft. Boom, 3 Yd. Bucket.

Also, Lima 1201 Shovel:
42 Ft. Boom, 37 Ft. Dipper Handle, 2½ Yd. Bucket.

Both Machines have Model L Cummins Diesel Engines.

Both Machines in excellent condition.

Used only two and one half years.

Located in Western Pa.

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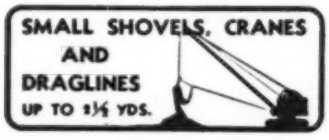
125 Marion diesel electric shovel, 55' boom, 36' tubular cable crowd stick, 4 yd. bucket, powered by 2 IHC diesel engines.
John Patch P. O. Box 896 Welch, Okla.



Bucyrus-Erie GA-2 No. 9764 combination shovel and crane. In good condition. Contact
G. Beemsterboer
11732 South Yale Avenue Chicago, Illinois
Pullman 5-6080

Northwest model 25; 6; 80D; 95. Manitowoc 6500; 4500 new — will rent. Bucyrus 54-B; Monighan 5W; 7W; 9W; 450.
A. W. Nevers Phone 32 Mt. Pleasant, Iowa

Model No. 104 Northwest dragline with 50 foot boom and 1¾ yard dragline bucket. New type cats. Located in Chicago, Ill., area—ready to go. Price $4000.
Errol C. White, R.R. 2, 143rd St., Lockport, Ill.

BYERS 83 shovel-hoe-crane, 1948. $12,500.
HD5G tractor shovel. $6500.
T9 Dozer, 1950. $4900.
Anzelmo, 85 River St., E. Rutherford, N. J.

3—Buda HP-326 gasoline engines, 6 cylinder, 3-3/16" x 4¾", Governor set @ 1600 R.P.M., complete with fittings. Bargain price $650 F.O.B. South Milwaukee, Wisconsin.
Bucyrus-Erie Company
South Milwaukee Wisconsin

Complete dragline equipment including 80-foot boom and 4-yard bucket removed from Bucyrus-Erie 120-B Serial No. 11572. Excellent condition. Price $12,000 F.O.B. Napa, California.
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NEW BELT CONVEYOR IDLERS
2000—30 & 36 IN. TROUGHING 6" ROLLS
1400—42 IN. TROUGHING 6" ROLLS
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600—30 & 36 IN. RETURN 5" ROLLS
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ALL ABOVE FITTED BALL BEARINGS.
30 COMPLETE NEW TERMINAL SETS WITH LAGGED HEAD PULLEYS
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Railroad ties—second hand; mostly top-grade cedar, suitable for shoring, blocking, temporary work, etc.
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Five Bucyrus-Erie 29-T drills, 440 v., 3 phase, 60 cycle, electric power, complete with tools and a stock of spare parts. Also one Bucyrus-Erie No. 12 bit dresser. Location: Middle West. Box 3482

Shovel front complete for Model 10-B Bucyrus-Erie. Good condition. S-1970 (B). SALE PRICE F.O.B. LOUISVILLE, KY. $850
Northwest Model 104 1-yd. shovel with heavy duty Amsco rock bucket, General Motor diesel engine 3-71 std. treads crawler mounted. Good operating condition. S-2000 (B). SALE PRICE F.O.B. LOUISVILLE, KY. $6000
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Gar Wood cable control tipdozer and double drum control unit.
BUCYRUS-ERIE 22-B shovel, dragline, and lifting crane.
CATERPILLAR, Model D-8 tractor with LeTourneau cable tipdozer.
NORTHWEST, Model 25 dragline with 40' boom and IHC engine.
For further information, contact
E. F. Craven Company
P.O. Box 538 Greensboro, North Carolina

HELP WANTED

Walking dragline operator required to train new operators and supervise manual handling of new 8 cu. yd. Bucyrus-Erie walking dragline being used in open pit mining operations in British Guiana. Established community staff mainly North Americans. Salary payable in United States dollars. Give full details, past experience, marital status, salary expectations.
Box 3480

OFFICE ASSISTANT

Position available for a young man with two years or more of Engineering training and some field experience with excavating machinery. Duties will include the preparation of written copy for printed instruction books, also correspondence with field personnel. Technical writing experience helpful but not necessary. Position located in middle west. State age, experience and salary expected. Reply to Box 3476 in care of Excavating Engineer.

POSITION WANTED

Position wanted as shovel, dragline, clamshell or pile driver operator. Have operated gas, steam and diesel large and small machines. Prefer steady work. P. O. Box 8, Hurricane, West Virginia. Phone 2224-Hurricane.

If you are Buying or Selling Used Equipment this is the place to let the Excavating Industry know about it.

TWO LPC TS 300 MOTOR SCRAPERS WORKED 4000 HOURS EACH . . .

with only 50¢ per hour per machine for ALL repairs!

Some of the Other Motor Scraper Features That Cut Earthmoving Costs

- Big capacity . . . 14-yds. struck and 18-yds. heaped . . . to haul bigger pay loads each trip.
- Over 22 mph for speed on the haul road, to make more trips per hour.
- Your choice of power . . . a 280 HP Buda or a 275 HP Cummins diesel for fast acceleration and extra power when you need it.
- Big interchangeable tires for extra traction and flotation.
- Easy loading characteristics that cut valuable seconds off your cycle time.
- Extra high apron lift and positive forced ejection for faster, smoother spreading.

That's really low-cost earthmoving for CONCRETE MATERIALS & CONSTRUCTION CO.

FROM March 1 to December 24, 1951, Concrete Materials & Construction Co. operated their LaPlant-Choate TS 300s two 10-hour shifts, six days a week, stripping 120-ft. of overburden on a job near Cedar Rapids. In 4000 machine hours, total repairs for each rig amounted to only 50¢ per hour, *and that included tires!*

To get ready for the new season, engines were completely overhauled and the only repairs found necessary were new rings and bearings. After 4000 hours, the cylinders showed only .002 of an inch wear!

It's no wonder Concrete Materials is sold on Motor Scraper performance. On top of such low maintenance, their TS 300s give them the kind of power that easily handled materials varying from sandy loam to heavy blue clay in a pit loaded with springs, making the going plenty muddy.

TWO YEARS' WORK IN ONE!

BY working their TS 300 Motor Scrapers two ten-hour shifts a day, with such little time out for maintenance or repair, Concrete Materials & Construction Co. completed two years' work in one. This was a job where the Motor Scraper's ability to keep punching, with little time out for tinkering, really paid off. Minimum maintenance is just another reason why it will pay you to follow the lead of so many big-time contractors who cut earthmoving costs with LaPlant-Choate Motor Scrapers. See your LaPlant-Choate distributor today for complete details about *all* Motor Scraper advantages.

LaPLANT-CHOATE

MANUFACTURING CO., INC. ® CEDAR RAPIDS, IOWA, U. S. A.

Cable-operated Scrapers in 6-, 8- and 14-yd. sizes for all makes of track-type tractors.

2- and 4-yd. Scrapers for track-type and rubber-tired industrial tractors.

Hydraulic and Cable-operated Dozers.

Have you *calculated* the economy of long-lasting wire rope?

Anyone using wire rope in quantity can't afford to guess whether it's a good buy. Each installation had better prove itself right down to the last decimal. That's how we want you to judge tough, flexible Preformed Yellow Strand. Its economies are the measurable kind: a fast rig-up and break-in . . . accurate control by the operator . . . prolonged service in the face of bending stresses, high speeds and shock loads. Seeing that you get the correct line for top production is the job of our special wire-rope engineers. Tell us now that you'd like to have one call.

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Yellow Strand®

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Factories:
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Distributors in All Industrial Centers